

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

DIESEL PROGRESS



FIVE DOLLARS PER YEAR

JANUARY, 1955

FIFTY CENTS PER COPY




MORE POWER

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TEXACO STAR THEATER
starring
DONALD O'CONNOR
or JIMMY DURANTE
on TV Saturday nights.
METROPOLITAN OPERA
radio broadcasts
Saturday afternoons.



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**...LESS FUEL...OVER
LONGER PERIODS**

YOUR BEST assurance of low fuel consumption—and low maintenance costs, too—is to use effective lubrication: one of the famous *Texaco Ursa Oil* series, a complete line of diesel lubricating oils especially refined to make engines deliver *more power* with *less fuel* over *longer periods* between overhauls.

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**FOR ALL DIESEL, GAS
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*builds
better
boats!*



DIESEL and GAS ENGINE PROGRESS

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IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

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FRONT COVER
ILLUSTRATION

The Nella IV, a 60-ft. promenade deck yacht, designed and built by Wheeler Yacht Co., is owned by Chester M. Lavron, Malden, Mass. It is powered with two GMC 6-71 inclined diesels which deliver a speed of 18 knots. Photo by Morris Rosenfeld, New York City.

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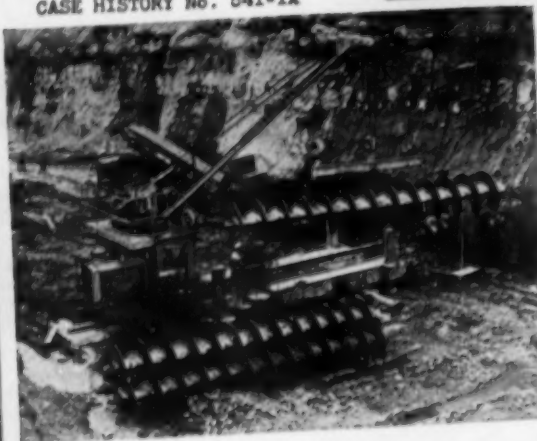
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GM DIESEL
CASE HISTORY No. 541-1X



OWNER: Peel Tree Mine, Clarksburg, W. Va.

INSTALLATION: GM "4-71" Diesel powers 42" McCarthy Coal Recovery Drill built by Salem Tool Company, Salem, Ohio.

PERFORMANCE: Mines up to 500 tons coal per day with 3-man crew. Works 9 to 11 hours per day drilling 170-foot holes 42" in diameter.

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MINES 500 TONS PER DAY with GM Diesel Power

Quick-acting General Motors 2-cycle Diesel power speeds production and cuts costs in every kind of mining operation.

With power at every piston downstroke from 2-cycle operation, a GM Diesel accelerates faster, responds to controls quicker. It fits where other Diesels won't in many kinds of mining equipment because it packs more power into a smaller, lighter engine. Clean simple design makes maintenance easy, speeds servicing. And when parts are needed, GM Diesel distributors give quick delivery at low cost.

Call in your GM Diesel distributor for full details on GM Diesel power for your mine. And before you buy a Diesel, check parts costs, too. For example, GM Diesel cylinder liners cost up to 40% less than liners for other Diesels of comparable power. That's one reason why GM Diesels cost less to buy and less to maintain than other Diesel engines.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN
Single Engines... 30 to 300 H.P. Multiple Units... Up to 893 H.P.

The Engineer's Report

CASE HISTORY

Chevron Starting Fluid
PRODUCT

San Francisco Chemical Co.,
FIRM *Montpelier, Idaho.*

Fast starts save 50 man-hours each day!



WITH TEMPERATURES DOWN TO 20 BELOW ZERO for weeks, Chevron Starting Fluid speeds up starts of trucks, tractors and shovels at San Francisco Chemical Co.'s phosphate mine at Lefe, Wyoming. Winter temperatures here sometimes drop to 50 below zero, but even then Chevron Starting Fluid makes it possible to start both diesels and gasoline engines. According to Mr. P. S. Pugnaire, General Superintendent, this occasionally saves the mine up to 50 man-hours a day — about 2 hours starting time for drivers of trucks and tractors, also time of other workmen who cannot begin work until equipment is operating. Chevron Starting Fluid is available in 1-pint cans and in 7- and 17-cc gelatin capsules. Your supplier also has the new Chevron Pressure Primer System using safe 9.9-cc pressurized steel bulbs which, when punctured, force priming fuel into air intake system, permitting instant ignition.

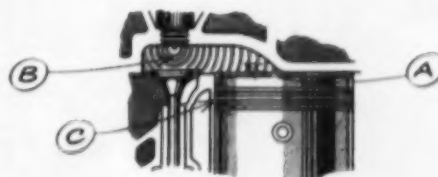
FREE FOLDERS tell you more about Chevron Starting Fluid and the Chevron Pressure Primer System. Write or ask for them today.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your distributor, write or call any of the companies listed below.



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- A. Atomizes in lowest temperatures and provides easily ignited vapor in combustion chamber.
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- C. Contains lubricant and additives—inhibits cylinder wear and ice formation in primer equipment.

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DE LAVAL HIGH PRESSURE TURBOCHARGERS

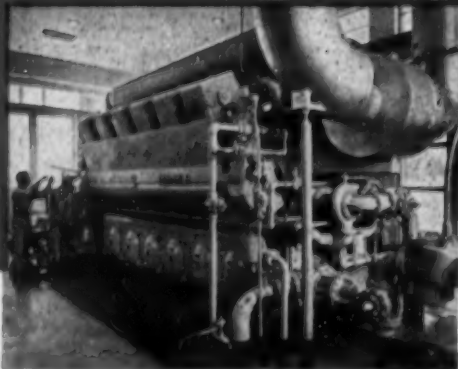
*increase output
by 100% or more*

- Rotor is constructed entirely of alloy steels.
- Turbine blades and turbine hub, made from a highly heat-resisting alloy, are an integral structure. This provides the highest possible safety factor.
- Turbine rotor is air-cooled, for safe operation with any temperature encountered in reciprocating engine service.
- Design of all flow passages minimizes possibility of clogging.

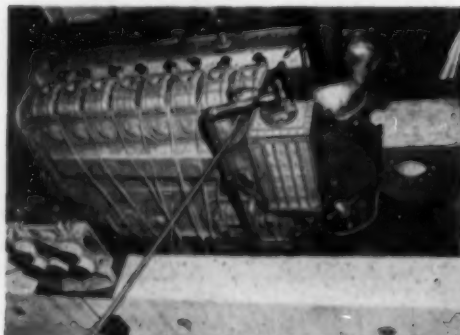
• Turbine nozzle box or turbine housing is not water-cooled. Thus there is only negligible heat rejection to engine cooling system.

• Turbine nozzle guide vanes are adjustable, so that turbocharger can be exactly matched to engine.

• Shaft end is free for driving lubricating system, tachometer and other accessories.



Here is a De Laval Type A-14 Turbocharger installed on a V 12-cylinder, 4-cycle diesel engine.



A De Laval Type B-8 Turbocharger, shown on test, is mounted vertically on an 8-cylinder, 2-cycle diesel.

*Exclusive
MONOROTOR
construction shows why*

These De Laval high pressure turbochargers represent the newest development in diesel engine design. In many cases they can double the output of heavy-duty diesel, gas and dual-fuel engines without increasing thermal loading. • They offer pressure ratios of 3:1 as well as far higher compressor and turbine efficiencies than those found in conventional turbocharger systems.

• De Laval turbochargers are self-adjusting to engine loads, can be used on 4- and 2-cycle engines. Write for Bulletin 8000 giving compressor curves and flow range diagrams.



DE LAVAL

Turbochargers

DE LAVAL STEAM TURBINE COMPANY

883 Nottingham Way, Trenton 2, New Jersey

DL200

DIESEL PROGRESS

"Our TD-24s Worked 15,000 Hours Before Trade-in"



TWIN GIANTS. Worked as a matched pair, the Cleghorn TD-24s and BULL-GRADERS peel 70-foot overburden off an 8-foot seam of coal.

POWERFUL BUT POISED, the TD-24s work the rocky overburden off the seam into the worked-out section of the 200-acre lease.

David Wiltse, strip foreman for big West Virginia operator finds INTERNATIONAL TD-24s tops for performance, durability.



L. E. Cleghorn is one of the biggest strip mine operators in West Virginia, and at his mine near Clarksburg he gets up to 15,000 hours hard work from INTERNATIONAL TD-24s removing 70 foot of overburden from an 8-foot seam.

David Wiltse, in charge of laying bare this coal seam, tells how he gets the job done:

"We are repeat INTERNATIONAL TD-24 crawler users because they have given us excellent production with very low down-time. Our old TD-24s worked up to 15,000 hours before being traded. The record actually speaks for itself. Each of our TD-24s has outproduced any of the other crawlers we have used. The way TD-24s work steep terrain or in the mud plus long tractor

life makes them 'Champs of the Strip'!"

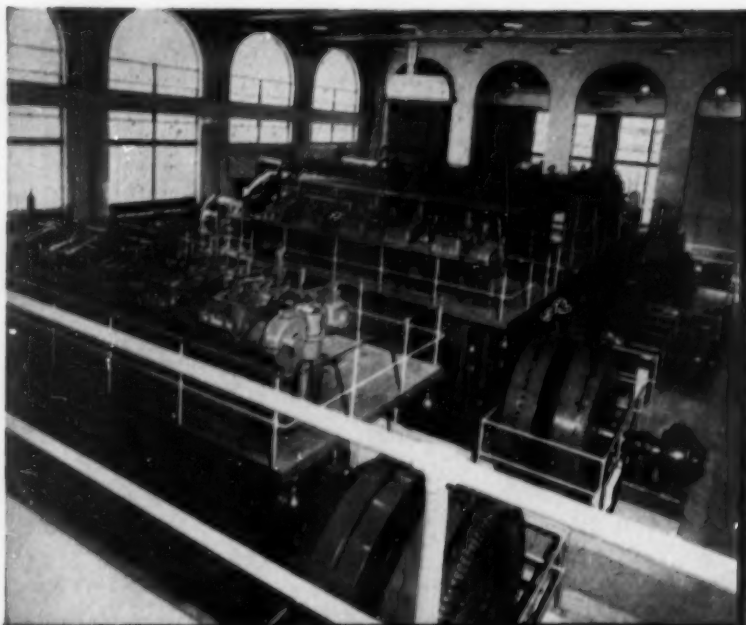
Want more proof? Just reach for that telephone and tell your International Industrial Power Distributor to bring out the IH crawler and equipment sized for your diggings. You add up the score on the comparative performance you see and then you'll know how much production and profit you can gain working with INTERNATIONALS.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.



INTERNATIONAL
INDUSTRIAL POWER

MAKES EVERY LOAD A PAYLOAD



Maintenance of plant buildings and equipment make this light plant a showplace station of which Pierre residents are justly proud.

What Happens When STANDARD HD OIL Is Called In on a Ring Sticking Problem

In 1946, after experiencing considerable trouble with ring sticking, Pierre, S. D., Municipal Light Plant management decided to test STANDARD HD oil in their 2,000 hp. diesel engine. Result: nine years later and after 31,840 hours of operation the original fill of STANDARD HD oil is still in the diesel.

Plant Superintendent Floyd Halbert says engine cleanliness is what he values most. "Cleanliness of the oil is outstanding," he reports and says further, "There is almost no carbon, a minimum of cylinder wall wear and complete freedom from ring sticking. There has never been a bearing failure. Maintenance time for lubrication is zero."

A typical record for STANDARD HD oil? Yes. STANDARD HD is helping many other plants establish new performance records, while setting new levels of engine cleanliness for old engines, and keeping new engines clean from the date of initial fill. Result: more and more folks with industrial lubrication problems like the one at Pierre, call for assistance from their Standard Oil lubrication specialist.

Perhaps you would like to find out more about STANDARD HD. In the midwest, call your nearby Standard Oil lubrication specialist. Or contact, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY
(Indiana)



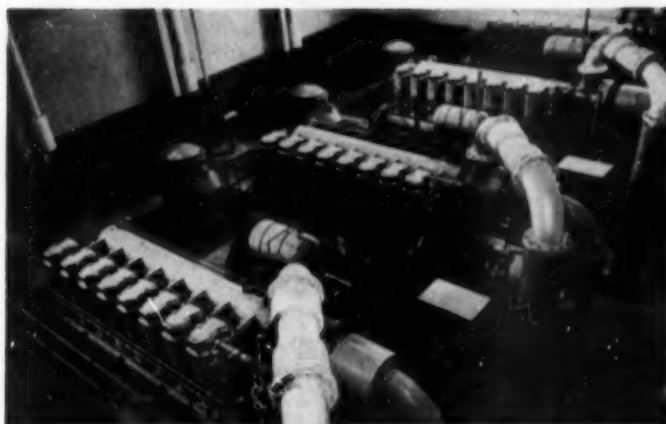
In addition to the 2,000 hp. engine, Pierre plant has a 3,000 hp. and two smaller engines. All are lubricated with STANDARD HD Oil. Floyd Halbert (right), and Standard Lubrication Specialist Bob Kirk, go over Pierre plant operation sheet. Bob Kirk is an old hand at helping people solve lubrication problems. He's been doing this for Standard since 1943. Bob got his engineering training from the University of Washington. He has also completed the Standard Oil Sales Engineering School. Customers find this experience and training pay off for them.



The Oakland storm water pumping station is equipped with four Enterprise Turbocharged Diesels driving huge mixed-flow pumps. Drainage conduits are large enough to drive an auto through.

Early construction stage of new pumping station, heart of the East Bay city's lowland drainage and flood control project.

Let it pour! Oakland licks storm flood problem with new diesel pumping plant



The four 1200 BHP Enterprise D5G-318 Engines are completely automatic, require no attendant. Rising water level starts engines, regulates speeds for proper pumping capacity.

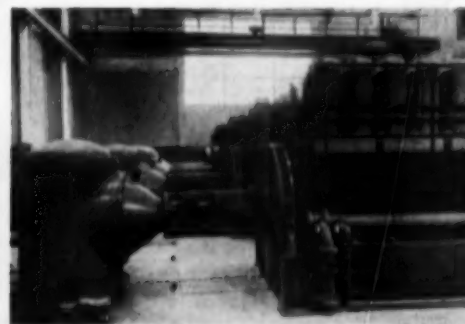
Will your city be faced with flooded streets and costly water damage this year? Your flood problem can be prevented by calling in qualified Enterprise engineers now to assist you in planning adequate, independently powered flood control facilities. No matter what pumping capacities you require, there's an Enterprise Engine designed to do the job more efficiently and at lower cost.

Enterprise Engines for every municipal need. Whether it's for flood or water supply pumping systems, stationary or portable electric generating plants, or for sewage disposal, you'll find there's an Enterprise Engine ideally suited for most dependable service. Contact the Enterprise Engine sales office in your area, or write us direct about your problem.

Over a million horsepower at work the world over!

ENTERPRISE dependable ENGINES

ENTERPRISE ENGINE & MACHINERY CO. • Subsidiary of General Metals Corporation • 18th and Florida Streets, San Francisco 10, California
Boston • Chicago • Denver • Jacksonville • Kansas City • Los Angeles • Minneapolis • New Orleans • New York • San Diego • Seattle • St. Louis • Washington, D.C.




Eight-cylinder engines drive giant axial flow pumps through flexible couplings and right angle gears.

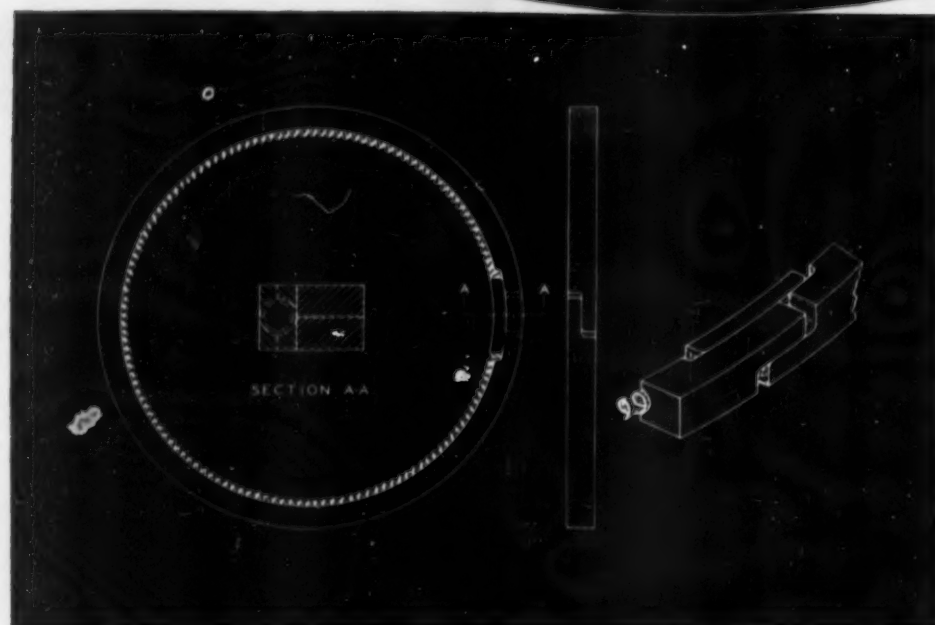


650 million gallons of storm water can be pumped through this Enterprise equipped station in 24 hours—a full railroad tank car every second!



THE CHOICE OF POWER EXPERTS

 **Look to COOK**



- 1** Complete flexibility assures perfect wall contact at all times. No wear in period required.
- 2** Sealing function is double acting which makes ring ideal for all services and simplifies installation.
- 3** Step-cut construction seals joint contact with cylinder. Special overlapping gib seals joint at groove sides. Seal complete at all points.
- 4** May be fabricated from any material, including bakelite.
- 5** Spring actuation independent of groove bottom which assures uniform distribution of tension.

for Better Rings!

COOKTITE 301-1X COMPRESSION RING— the Perfect Seal, in Sizes 6 to 60"!

Ideal for any Service—Available in any Material!

FROM the minute it's installed and throughout its long life, the new Cooktite 301-1X compression ring fits tight around the cylinder—and every inch of the stroke—even in worn or out-of-round cylinders. The secret is in its design—uniform tension and perfect flexibility are provided by the spring member which is independent of the groove bottom. Step-cut construction seals the cylinder contact completely, and prevents blowby. A separate overlapping gib seals the inner joints at both sides of the groove, and all parts have free toggle action to prevent key locking and breakage.

The Cooktite 301-1X is available in sizes from 6" to 60" in any material to suit the service intended. For larger sizes, grooves may be reduced to cut down both ring and piston weight, thus reducing inertia forces and the effect of G values.

The Cooktite 301-1X is extremely easy to install and is ideal for all types of service—compressors, internal combustion engines, liquid pumps, pneumatic clutches, chucks, valves, etc. Mail the coupon today for additional engineering data on your particular problem.

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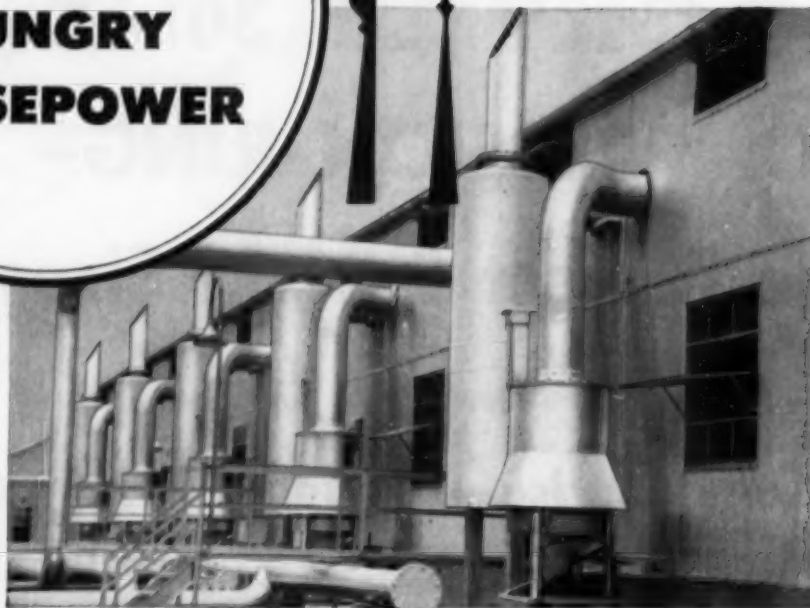
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940 South 8th Street
Louisville 3, Kentucky

Gentlemen: Please send me complete engineering data on the Cooktite 301-1X compression ring.

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Attention: _____
Type of Units _____

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DIET
for
HUNGRY
HORSEPOWER**

Clean air for 4750 horsepower! A new, low resistance Cycoil serves each of five 1350 H.P. Cooper-Bessemer engines at Warren Petroleum's Saunders Gasoline Plant, Lea County, N. M.



**New Cycoil Oil Bath Air Cleaner combines
low resistance with highest cleaning efficiency**

LOWER the resistance but don't tamper with Cycoil's high cleaning efficiency! A big order but AAF engineers followed your specifications to the letter in developing the new Type "P" Cycoil.

The problem—finding a practical, effective method of impinging air upon the oil at low velocity. The solution—a perforated entrainment plate in the air stream, over which oil flows from a central distributing head. Calibration of the metered orifices in the plate serves to increase the velocity of air flow through the openings to entrain the oil that tends to spill over the edges and distribute air flow uniformly over the filter area. After leaving the per-

forated plate, the air passes upward through primary and secondary filters for removal of its dust and oil content.

The new low resistance Cycoil is available in two types to insure uniformly efficient performance in any desired operating range—(1) Type "P" with standard metered orifices for engines operating from 50% of rated capacity to maximum rating and (2) Type "PV" which, by adding Vari-flow valves to orifice openings, provides sustained high cleaning efficiency from as low as 10% of rating to full capacity. Call your local AAF representative, now, for complete Cycoil data or write direct for Bulletin 160.



American Air Filter
COMPANY, INC.

American Air Filter of Canada, Ltd., Montreal, P. Q. • 408 Central Avenue, Louisville 8, Kentucky

The best locomotives are even better today!



Six 2400-Horsepower E9's Delivered to Burlington

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The Chicago, Burlington & Quincy has a variety of passenger, freight and switching units in its General Motors Diesel fleet.

The road gets the best return on its investment because its Operating Department can match motive power to train weights, *can pick the right locomotive for the job.*

ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

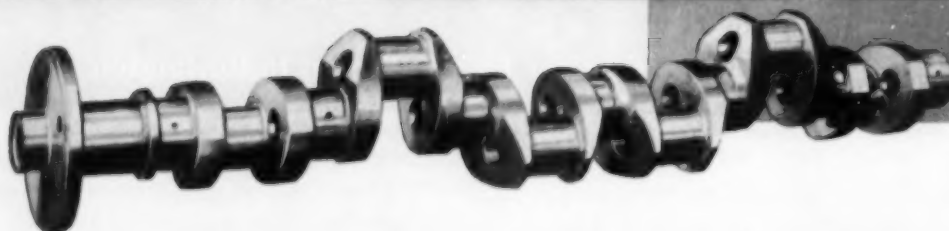


La Grange, Illinois • Home of the Diesel Locomotive • In Canada: GENERAL MOTORS DIESEL, LTD., London, Ontario

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40th GM DIESEL TUG for the Moran fleet



The "CHRISTINE MORAN" was designed and built to the specifications of the Cleveland Diesel Engine Division of General Motors. Design Agent: Tams, Inc., New York. Builders: Gulfport Shipbuilding Co., Port Arthur, Texas.

"CHRISTINE MORAN" is the 40th General Motors Diesel-powered tug to join the Moran Towing & Transportation Company fleet since 1938. This modern work horse is equipped with GM Diesel-Electric Drive that lets her skipper switch instantly from full ahead to full astern for faster, easier maneuvering in New York's crowded harbor.

"Diesel-Electric Drive tugs have it all over steam tugs for over-all operating efficiency," says Admiral Edmond J. Moran, President of Moran Towing. He

adds, "There's nothing to compare with GM Diesel-Electric Drive for handling ease in close quarters and for large and heavy tows. GM Diesel-Electric Drive handles soft as velvet."

Have a Cleveland Diesel Engine Division representative survey your water transportation operations. He'll prove to you that General Motors Diesel-powered tugs will do more work, faster, at less cost—will improve your operating efficiency on every towing job.

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faster, smoother

The watchwords of today's American railroads—faster, smoother travel—are typical of the Pennsylvania Railroad's stream-liner, the Spirit of St. Louis, which makes the trip between St. Louis and New York an enjoyable experience for the traveler.

Gulf Dieselmotive Oil contributes to the fine performance of the giant Diesel engines that power the Spirit of St. Louis and many other crack trains. Here's how this top quality Diesel locomotive lubricant helps keep maintenance costs down, availability up:

- 1 Effective detergent action prevents harmful piston ring belt deposits.
- 2 Base stocks are selected for their ability to help prevent hard deposits on the piston crown and in the ring belt area.
- 3 100% solvent refining (removing undesirable constituents) insures greater stability and better bearing protection.

Gulf Sales Engineers, experienced in railroad Diesel operation, are always available to aid you in maintaining high standards of lubrication throughout your system. Write, wire, or phone your nearest Gulf office today, and have a Gulf Sales Engineer call.

Gulf Oil Corporation • Gulf Refining Company • 1822 Gulf Building, Pittsburgh 30, Pa.

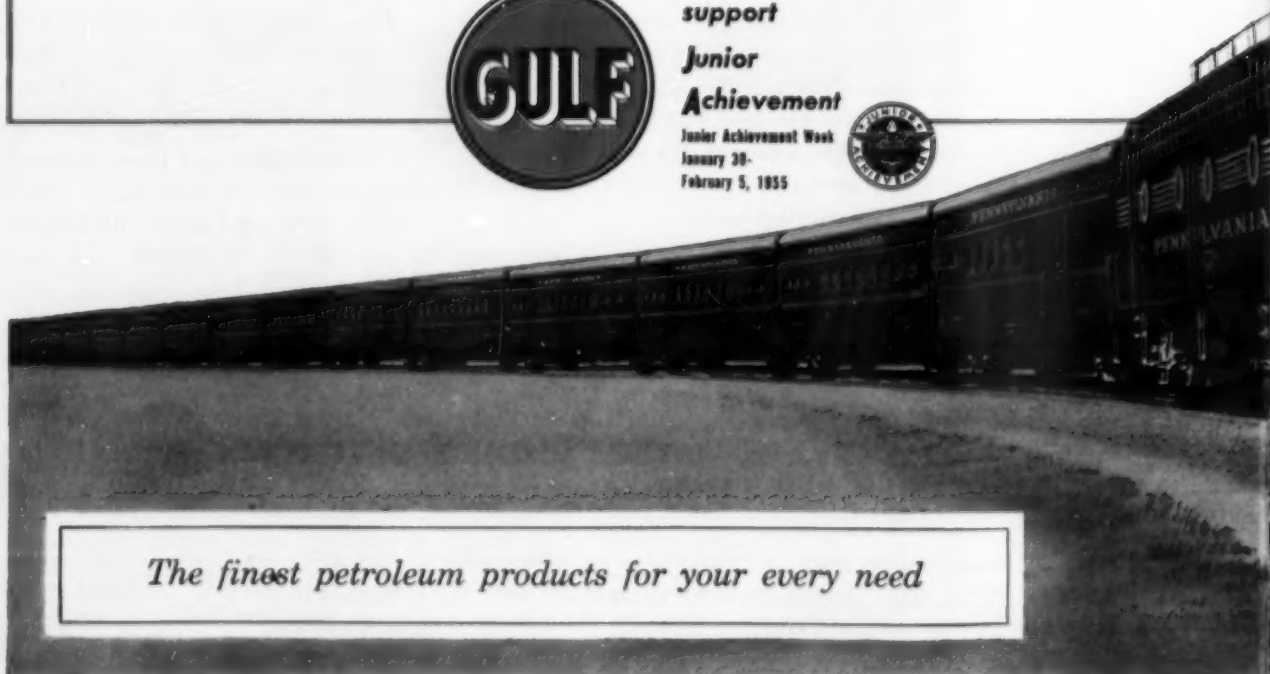


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January 30-
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than ever before—

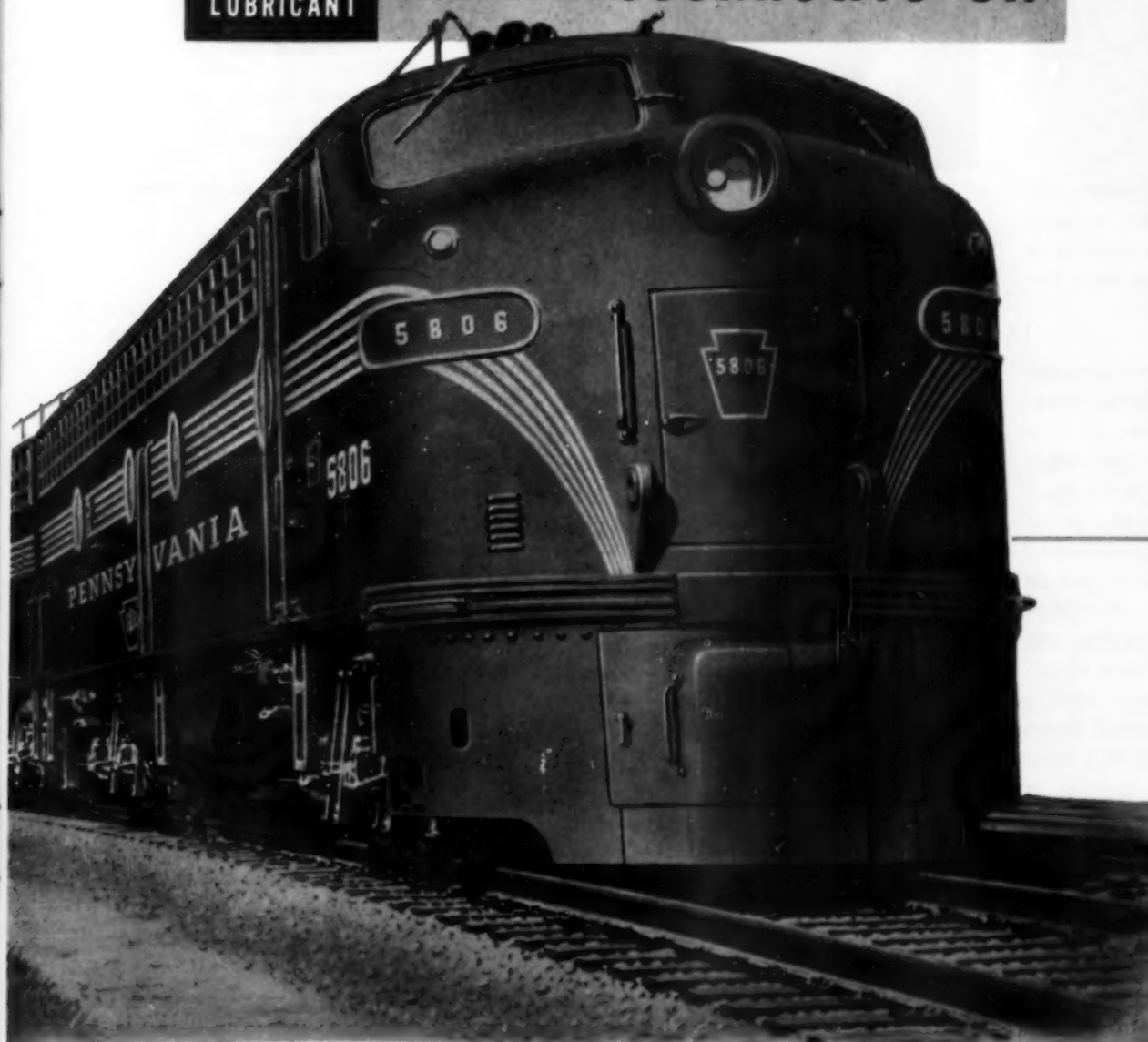
THE
TRAIN

the Pennsylvania's crack

"Spirit of St. Louis"

THE
DIESEL
LUBRICANT

Gulf Dieselmotive Oil



"BUSINESS IS GOOD, WI



ROBERT H. MORSE, JR.

President

Fairbanks, Morse & Co.

1955 will be an exceptionally active and competitive year. It will witness the two-stroke cycle diesel engine consolidating its popularity gains and extending them further by the use of supercharging.

A two-stroke engine in the high compression gas engine design will make further progress in becoming a factor in the gas and liquid pipe line pumping fields. The industry will make further progress in the burning of residual fuels to the point that for most bunker fuels, engine wear rates which are fully acceptable to the trade will be generally obtainable. The use of residual fuels will be extended to heavy-duty, medium-speed engines of specialized design, such as the Fairbanks-Morse Model 38D8½. Research work has been performed during 1954 and proof found that it is fully feasible to consume bunker fuels.

The use of the very small diesel engine will be greatly increased as various applications in the armed services create a demand for continuous operation of engines. This prediction is based upon proof recently submitted to the industry by Fairbanks-Morse that its small high-speed diesels can operate reliably without human attention for as long as 9000 hours.

Rotative speeds will trend higher, although piston speeds will remain within the present

range. The increased rotative speeds will require improved bearing designs for some manufacturers who are not now using bearings similar to the aluminum alloy type featured on Fairbanks-Morse engines.



E. J. SCHWANHAUSSER

Executive Vice President

Worthington Corp.

We believe several important considerations will dominate 1955 sales. One trend is toward larger engine generator units, many installations requiring up to 2500 kw. single unit sizes for municipals and industrials. Too, due to supercharging and after-cooling, ratings are increasing still higher with bmeep ratings offered up to 140 psi and well beyond. Three manufacturers are recognizing the trend toward larger units and are employing extended research in developing engines of much higher bmeep ratings, greater rotative speeds with applications of advanced metallurgy and finer workmanship, better thermal efficiency than heretofore, and taking advantage of lower cost residual fuels. We predict increasing demand for tri-power engines operating as either full diesel, dual-fuel diesel, or spark-ignition gas engine, particularly where natural gas is generally available at low cost. Use of heavy-duty engines of these types for standby emergency power will also increase in urban and remote areas. We look for continuing volume of internal combustion engine generator installations in 1955 equalling or greater than 1954.



A. W. McKINNEY

President

National Supply Co.

Past President

**Diesel Engine Manufacturers
Association**

The National Supply Co. anticipates that its sales of Superior and Atlas engines will reflect some of the expected improvement in general business for 1955. For oil field use, in some areas natural gas engines will probably show greater sales improvement than diesels, because the supply of gas provides a less expensive fuel. However, in other areas the use of diesel drilling engines is more economical and will continue. The fact that wells are being drilled to greater depths requires bigger rigs, with more powerful engines, and serves as another potential boost for diesel engine sales. Increased oil activity in foreign countries provides another stimulus.

Our forecasts indicate that there may be a decline in the sales of marine and stationary engines for other than oil field use. However, we expect a substantial share of our engine income from these sources.

Unquestionably, competition will be keen, and quality, delivery, and price will affect the amount of business done by any engine manufacturer. It will be our purpose, of course, to produce the best possible engines for their particular fields and to keep our deliveries and our prices competitive.

I LL BE BETTER IN 1955"

... say top leaders of diesel engine industry



THOMAS E. HUGHES
General Manager
Cleveland Diesel Engine Division
General Motors Corp.
President
Diesel Engine Manufacturers
Association

After a careful study and evaluation of the guide posts which have proved reliable in the post-war years, I'm of the opinion that the year 1955 will be a successful one for the manufacturers of internal combustion engines. This opinion is arrived at by giving full consideration to every factor which has influence in our industry. During the past 10 years, we have witnessed a firm but gradual readjustment from a wartime economy to one of peace. This influence has been marked and progressive. It is only within the past few months that our government leaders have been optimistic concerning global peace and hopeful of a settlement to the many international problems which might jeopardize this peace. This situation makes it possible for all of us to concentrate our thinking and planning toward an expansion of a firm and stabilized business program. All around us, in every industry, we witness this attitude in its leadership. Since we are a definite segment of our nation's business, we must necessarily arrive at the conclusion that we will have good business in the forthcoming year.



GEORGE H. LYNN
General Sales Manager
Hamilton Division,
Baldwin-Lima-Hamilton Corp.

The coming year should present a challenge to the diesel industry. Never before has so much progress been made in such a short time in changing engine ratings, efficiencies, applications and redesign. The race for increased horsepower, more little kilowatts buzzing through the lines, is today the "American Theme" as noted by all industries. Look at the automotive industry, the machine tool industry with its greater horsepower to transmit power. We in the diesel industry are driven by the same desire to get more from an engine and to show its greater versatility. Industries never heretofore approached are welcoming the place of the diesel in their activities. Larger municipal installations are becoming the rule, not the exception. Greater marine use of diesels is an accepted fact due to ability to burn residual oils. Dual-fuel engines result in dollars in the pockets where users have gas supply. The forward steps in dual-fuel engine design are as great a factor for predicting increased diesel applications as any other possible reason. Home markets, as well as foreign markets, have been just barely exploited as to the economies of diesels. Many, many times we hear of the horsepower and the population, and the efficiencies ruling diesels out of an application and when analyzed none of these reasons can be supported. Multiple instal-

lation, flexibility of operation, price per kw. all prove diesel is the answer, and we look forward to the task at hand in 1955 to sing and shout our engine story. We have the product, the initiative, the market, and the opportunity, so what more besides Utopia could be desired?



HARALD T. REISHUS
Vice President
Industrial Power Division,
International Harvester

We feel that 1955 will be a better year than 1954 for diesel engines in construction and agricultural equipment, and for gas and LPG engines in the irrigation and oil field markets. Our opinion on diesel engines is based, first, on the very favorable forecasts regarding construction industry volume in 1955, second, on the high level of use given diesel-powered construction equipment in 1953 and 1954 which has taken a heavy toll of the inventories carried over from "scare" buying during the Korea situation, and, third, on improvements in engines and equipment that reduce construction costs. We are equally optimistic concerning gas and LPG engine sales for two reasons: (1) Because of the increasing interest in supplementary irrigation, further encouraged by the recently approved government financial assistance to farmers, and (2) because we have not only added more such engines to our line but have also revised our power unit field sales organization to give better application assistance and service to engine users.

"BUSINESS IS GOOD, WI



R. E. HUTHSTEINER

President

Cummins Engine Co., Inc.

I think that I can answer best what is in store for our industry in 1955 by reviewing what happened in 1954. Everyone remembers what took place in the late months of 1953 and the early months of 1954. Some people said it was a recession and others said it was inventory liquidation, but regardless of the name, the result was a drastic reduction in new business booked. In spite of dreary forecasts, it appears that Cummins sales and profits for 1954 will exceed those of 1953.

Our approach to 1955 (in spite of the general improvement in business) is still the same as it has always been. We realize that our industry, and the industries which we serve, are all faced with highly competitive conditions and that success will come to those companies which recognize the needs of their customers and meet them.

Our whole effort continues to be directed toward improvement in our product, control of our costs, development of new models and applications to fit specific requirements, and reduction in the cost of operating Cummins diesels. During 1954, specific action along these lines included introduction of our PT Fuel System, turbo-charged engines, tilted engines, and additional engine models in the lower horsepower range. Throughout the year, we have carried on research activities both at Columbus and throughout the world on reduc-

tion of maintenance cost through improved dirt protection, better cold weather operation, many refinements of engine components, and longer overhaul intervals. Our confidence in the future is evidenced by the 60% expansion in our Research Laboratory facilities, which will be in use early in 1955.

Finally, aside from the technical problems, we believe that good, old-fashioned selling and "doorbell ringing" is still essential for success in any business. We have made substantial increases in our direct factory sales force; we will soon announce the opening of additional factory regional offices; and we have entered into a program for still further expansion of our maintenance and service parts distribution facilities.

We think that 1955 will offer even more opportunities for our industry than any past year, but the greatest success will come to those companies with an aggressive research program, new models and applications to meet the customers' requirements, good service facilities, an adequate and competent sales and service organization, and recognition of the importance of reducing total cost of operation for the ultimate user of our products.



O. H. FISCHER

President

Union Diesel Engine Co.

The growth of the diesel engine industry was accelerated during the war. During this postwar period this rapid growth has had time to season and selectively thin itself. It appears probable that within the

next few years the war stimulated activities will result in increased business.

Many diesel installations were made in post-war years with engines bought from war surplus. Quite often price was the governing factor rather than suitability. This resulted in higher operation and maintenance costs. It also resulted in lower volume of new engine business for manufacturers. Apparently the end of this situation is close at hand.

The diesel engine has an expanding field of application. Its design is far from static. 1955, with a more stable economy, should result in greater volume for the industry with a wider distribution in world markets.



WILLIAM CLAUSEN

Executive V.P. & General Manager

Enterprise Division, General Metals Corp.

Great strides are being made in the diesel engine industry through new engineering developments, and the Enterprise Engine and Machinery Co. in San Francisco is contributing its share to that progress through the development of engines in capacities up to 6150 horsepower. Other development work is underway, which we confidently expect to release for sale during 1955.

We are looking forward to a substantial increase in sales volume in 1955, due to a firming up of our national economy, the stabilization of the international situation, together with a very comprehensive expansion of our field sales and service organizations, and the establishment of addition-

LL BE BETTER IN 1955"

... say top leaders of diesel engine industry

al new branch offices and parts depots throughout this country and abroad.

Through field contact work and through commercial research, our organization is constantly seeking new applications for diesel engine power. Our sales will no doubt be materially augmented by the development of new applications.

The Enterprise Engine and Machinery Co. has expanded its research and development programs in order to carry its proper share in developing a more prosperous future for the diesel engine industry.



W. T. CROWE
General Manager
Detroit Diesel Engine Division
General Motors Corp.

Looking ahead to the coming 12 months of 1955, and with a good year having just closed behind us, it is my opinion that the new year will bring a continued strong demand for diesel-powered equipment. Not only has the diesel engine proven itself to be the workhorse of the construction industry but in whatever field it has been applied it has turned in outstanding records of performance, durability, and economy.

With the nation awakened to the need for an improved and expanded highway program, the requirement for diesel-powered road-building equipment should be accelerated. Likewise, I believe that the general

economy during this coming year will average a higher gross amount of goods and services produced. In other words, the general level of business will be better than the past year.

The diesel engine industry has made and will continue to make a substantial contribution to the progress of the national economy. In almost every phase of our daily lives we are dependent upon diesel power . . . in the petroleum industry . . . in agriculture . . . in transportation . . . in construction . . . marine and other fields.

We at the Detroit Diesel Engine Division of General Motors Corp. are proud to be a part of the diesel engine industry.



JOHN C. KEPLINGER
President
Hercules Motors Corp.

I would say that 1955 looks as if it will be a year in which aggressive selling, economical manufacture and new product developments will yield good returns.

The Hercules Motor Corp. approaches the new year with confidence that their new sales program, involving many far-reaching developments which fulfill a long existing demand in the diesel engine field, will stimulate business and we are anticipating a period of tight competition which will result in benefits to both buyer and seller.



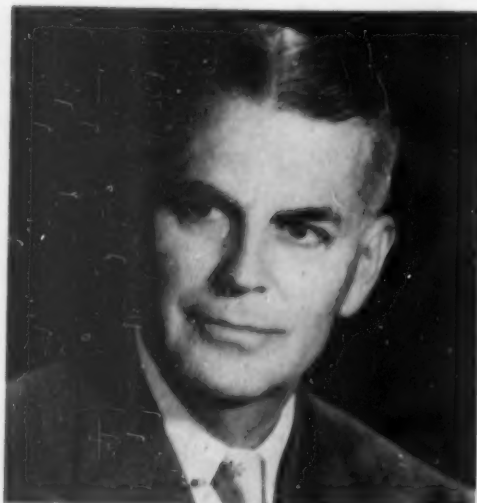
C. J. REESE
President
Continental Motors Corp.

So far as Continental Motors is concerned, indications generally point to a good year in 1955. The company's line is broader and more diversified than ever before, and the outlook, in the various markets with greatest volume potential, forecasts healthy business not only for the farm, industrial and transportation equipment, and aircraft, but also for engines and power units, including gasoline, diesel and multi-fuel types.

Among factors with greatest bearing on this forecast are the generally prosperous construction industry — including oilfield — the tremendous road-building program, both pending and current, and the rapid strides which irrigation of all types is making, especially through the South, Southwest and West. Continental is manufacturing not one but a variety of models at closely-spaced power levels from two to more than 1000 hp. power plants engineered and built for a wide range of specialized jobs. These engines are available with the performance characteristics ideally suited to each application, avoiding any compromise whatever, and may be had for use on locally-available fuels. It is pertinent to add that Continental has done much to adapt the diesel principle to mass marketing application.

"BUSINESS IS GOOD, WILL BE BETTER IN 1955"

. . . Say Leaders of Diesel Engine Industry



N. C. DEZENDORF
General Manager
Electro-Motive Division
General Motors Corp.

Outlook for the diesel industry in 1955 is brighter than a year ago, with new applications of diesel engines promising to augment established markets. In the railroad field, the new locomotive business for the first half of 1955 looks appreciably better than business in the last half of 1954. More railroads will avail themselves of the advantage of complete dieselization during 1955. There are still over 9000 steam locomotives owned by American railroads as of last October 1st. More than 8000 of these were serviceable. This indicates a substantial new diesel locomotive business before all of the railroads are dieselized.

The new locomotive business for foreign markets also looks good for 1955. Electro-Motive early in the year will complete an order for 51 locomotive units for Cuba, sold through General Motors Overseas operations. There is every indication that the potential world market for diesel locomotives is even greater than the domestic market, although it is complicated with problems of monetary exchange.

Adding substantially to railroad diesel volume in 1955 will be parts and rebuild business, which already exceeds the new locomotive business of a few years ago in dollar volume. Locomotive upgrading, rebuilding of old diesel locomotives to today's production standards—offers railroad manage-

ment an economical means of increasing horsepower without large investment.

Outside the railroad field, we see continued growth of the diesel market through application of electro mobile power units. Introduced to electric utility companies last October 12, these mobile and portable generating units provide electric companies with an economical means of delivering electric power in far outlying, or fringe areas, and for emergency use.



P. T. EGBERT
President
American Locomotive Co.

In my viewpoint, the general business outlook for 1955 is considerably brighter than it was for 1954. Our surveys indicate that this increased activity will be reflected in expanding applications for stationary and marine diesel engines.

During the past year, Alco has developed a number of diesel engine products which are sure to enhance our competitive position. Among these are the new oil well drilling rig power set and our portable diesel-electric power plant, both of which have aroused considerable interest among our customers. Through developmental engineering, we have also broadened the base of Alco's 9x10½ engine for wider application in the stationary and marine fields. Examples of this are direct reversing for marine use and dual fuel and straight gas for stationary installations. Therefore, with an expanding market, Alco expects to become an increasingly important factor in the diesel field.



HARMON S. EBERHARD
President
Caterpillar Tractor Co.

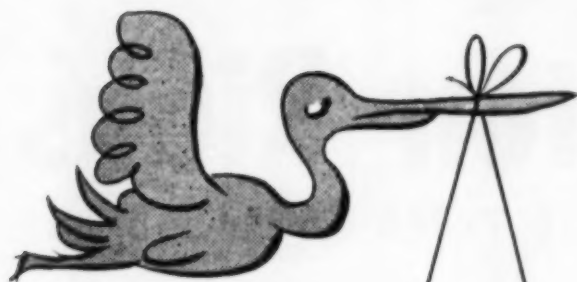
In 1931, Caterpillar Tractor Company completed designing and building a unique new diesel engine for the first commercially successful diesel-powered crawler tractor. Since that time the features which peculiarly suited our engines to tractor service have won for them increasingly diversified application and have built for us a large engine business.

This business progressed to the point that in 1953 the Caterpillar Engine Division was formed so we could enlarge and improve our ability to satisfy engine customer requirements, particularly in the five sizes of engines now manufactured which are too large for use in Caterpillar machines.

Most of our engines sold outside of our own machine requirements today, be they for industrial, marine, generator or other applications, are built for special arrangements to fit the individual customer's needs. The combination of existing and new attachments to suit varied customer demands are limitless. There is an increasingly strong interest in modern, four-cycle engines—particularly those that are supercharged.

We are pleased that the buyer has now returned to his rightful place in the market—the right to be a customer, and we note that the buyer now is showing more interest in the cost of fuel, of repair parts and in the frequency of overhaul. This certainly encourages production of quality machines for greater customer satisfaction.

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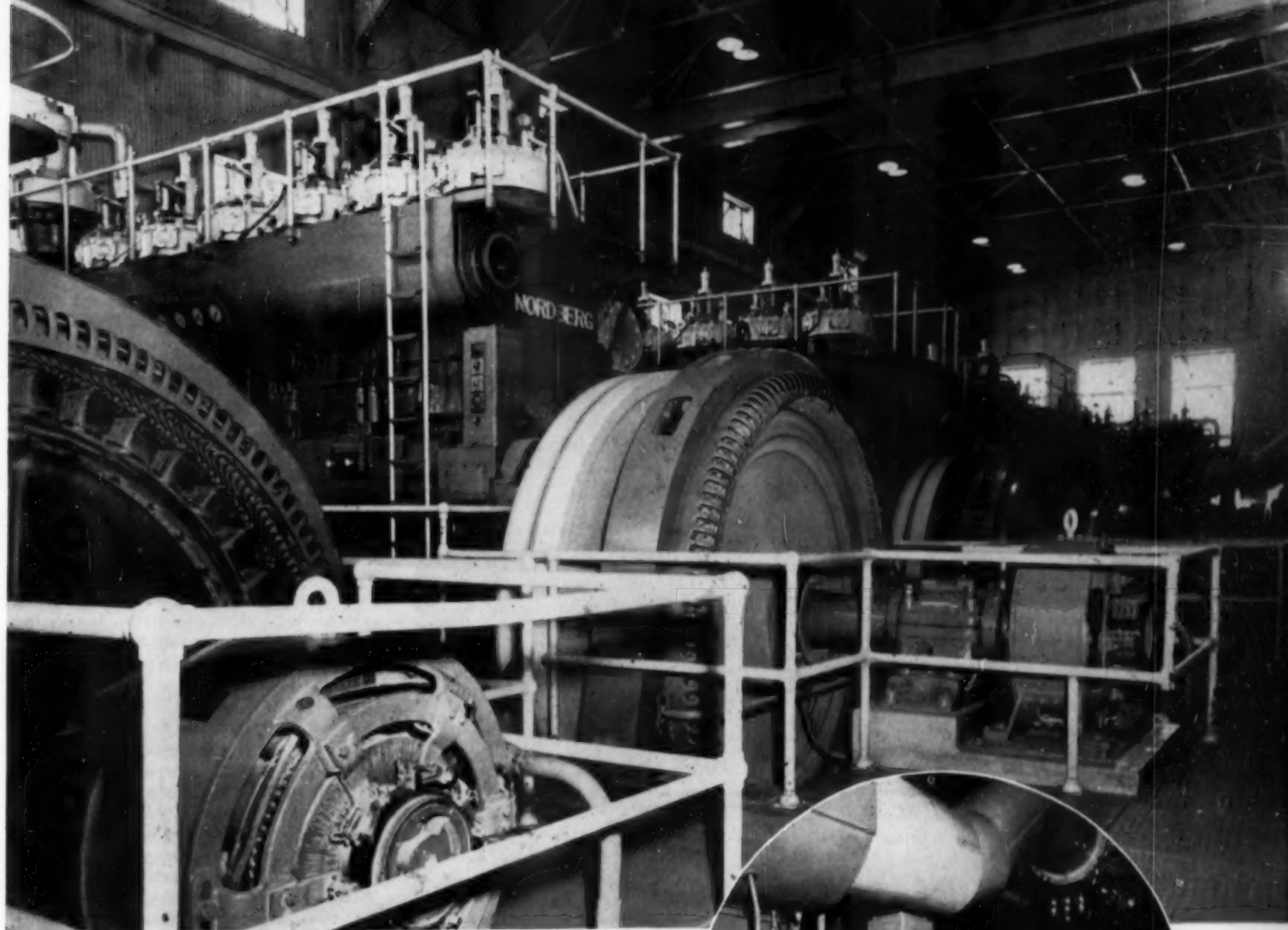
Immediate delivery on Daros Piston Rings is being made from Chicago on popular sizes and types for large bore Diesels and Gas Engines; delivery time on all other sizes—four to six weeks. Shipments to South and Central America will be made direct from Gothenburg, Sweden.

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D. D. Cook, President

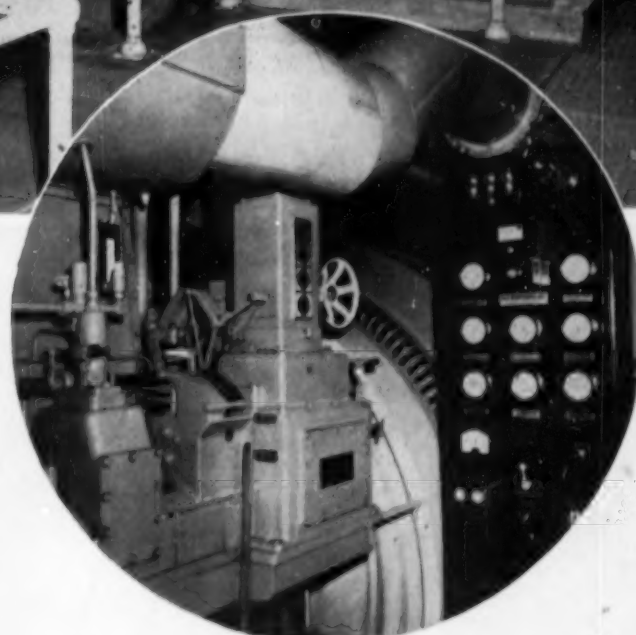
1737 Howard Street

Chicago 26, IH., U.S.A.



These six Nordbergs produced more than 53,000,000 kwh. in a year to operate Potash Co.'s mining and refinery equipment.

Control station shows Woodward governor, and Nordberg panel with Viking alarms, Alnor exhaust pyrometer, and Lonergan gauges.



DUAFUEL ENGINES POWER POTASH MINES

Potash Company of America Uses Six Nordberg Duafuel Units, Operating 98.6 Per Cent of Time

SIX Nordberg Duafuel engines are in operation more than 98.6 per cent of the time at the Potash Company of America's Carlsbad, New Mexico mines, generating dependable, low-cost electric power for the company's varied operations. Provision of electricity for mining and processing is a demanding service. In the Carlsbad mines, electric power is required to operate the big mine hoists, trolley locomotives, continuous miners, undercutters, loaders, conveyors and battery chargers. In the refinery, electricity runs the ball mills, flotation units, driers, pumps and other equipment. Moreover, PCA operates 24 hrs. a day every day of the year. This heavy continuous usage adds up to an annual consumption of almost 70,000,000 kwh.

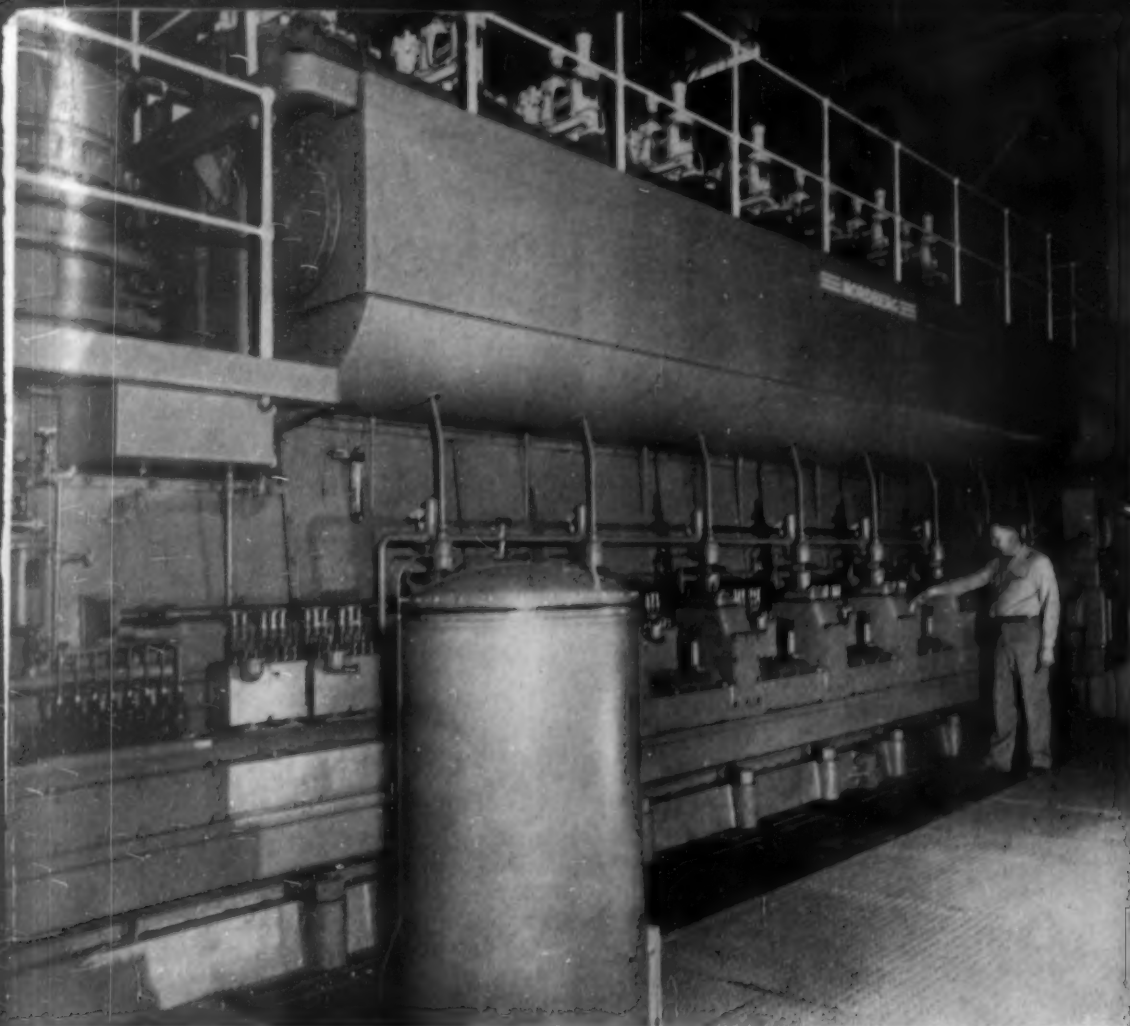
To meet this demand for power, Potash Company of America has developed a diesel plant with eight engines with a total sea-level rating of 13,300 hp.

Its own production is supplemented with some purchased power. The plant was started in 1933 with the installation of a 400 hp. De LaVergne diesel which has since been removed to make way for larger units. In 1934, a 600 hp. Worthington was installed, followed the next year by a 750 hp. De LaVergne. The first of the plant's six Nordberg engines was installed in 1936, a 750 hp. mechanical-injection diesel. In 1937, the company purchased a 1500 hp. air-injection engine, and, two years later, another identical unit. These three

diesels have 17 in. bore and 25 in. stroke and develop rated horsepower at 257 rpm. With cheap natural gas available, PCA in 1940 converted the three Nordberg's to dual-fuel operation, burning gas admitted to the cylinders at high pressure with a small quantity of pilot oil to initiate combustion.

In 1941, growing demand for power dictated the addition of another, larger engine, a 2400 hp. gas-burning Nordberg diesel of 21½ in. bore and 29 in. stroke operating at 225 rpm. Another identical dual-fuel unit was installed the following year.

Newest and largest engine in the plant is the 3400 hp. Nordberg gas-burning diesel, a unit with



This 3400 hp. Nordberg is largest in plant. Accessories shown, left to right, are Nugent fuel filter, Manzel lubricators, and Honan-Crane lube purifier.

The big Nordberg drives a Westinghouse generator rated at 2230 kw. At right is 3-stage gas compressor which provides 1150 lb. gas fuel for injection.

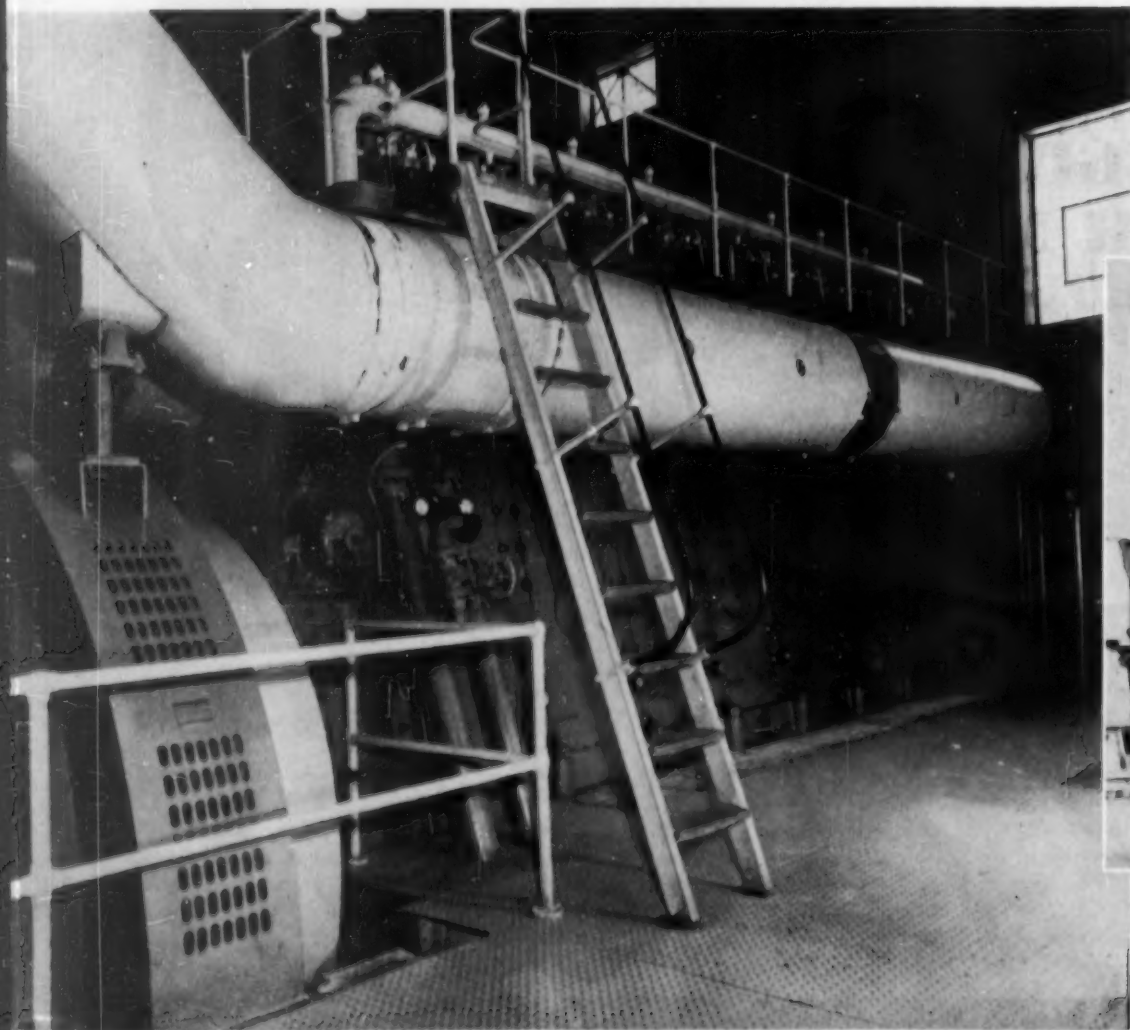


TABLE I
Operating Data July 1953 - June 1954

Kilowatt-Hours Generated	
Dualfuel Engines	53,572,900
Oil Engines	264,800
Total	53,837,700

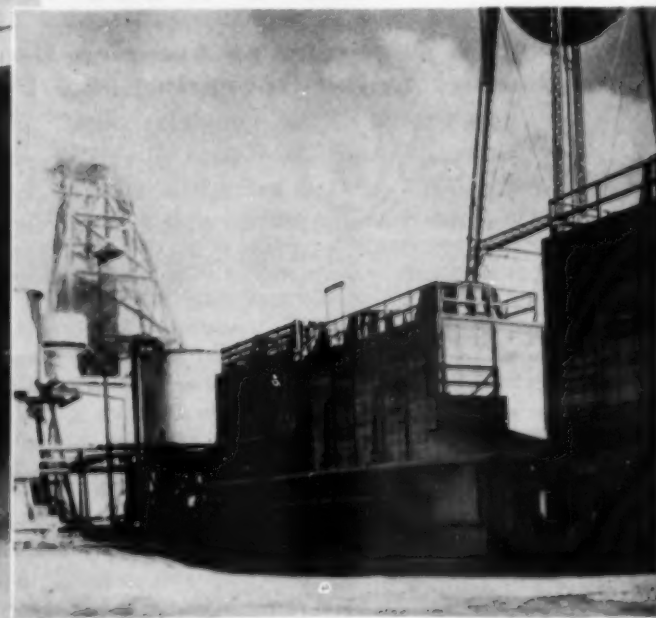
Fuel Consumed	
Natural Gas (mcf.)	605,247
Cu. ft. per kwh.	11.29
Pilot Oil (gal.)	229,583
Gal. Pilot Oil per kwh.	0.0042
Diesel Fuel (gal.)	22,978
Kwh. per Gal. Fuel	11.52

Plant Load	
Average (kw.)	6,145
Hourly Peak (kw.)	7,260
Momentary Peak (kw.)	11,960

eight cylinders of 21½ in. bore and 31 in. stroke, rated at 225 rpm. (All engines in the plant are derated about 8% at the plant elevation of 3265 ft.) The big engine went into service in December, 1951, giving the company six Nordberg gas-burning engines with combined capacity of 11,000 hp. at the plant's altitude.

These Dualfuel units have been an efficient and economical source of power. In the year ending June 30, 1954, the plant generated 53,837,700 kwh., of which the Nordbergs produced 53,572,900 kwh. In generating 53,572,900 kwh., the six Nordberg engines used 605,247 mcf. of natural gas and 229,583 gal. of pilot oil, an average of 11.29 cu. ft. of gas and .0042 gal. of oil per kwh. Table I summarizes figures on production, fuel consumption and loads carried by the engines.

Having achieved this efficiency in production, it is natural that the company should use its Dualfuel engines as a preferred source of power. In the 12-month period cited, all six engines were in virtually continuous operation, running an aggregate total of 51,855 hours, actually 98.6% of the time. Engine hours for the six units ranged from 8,622

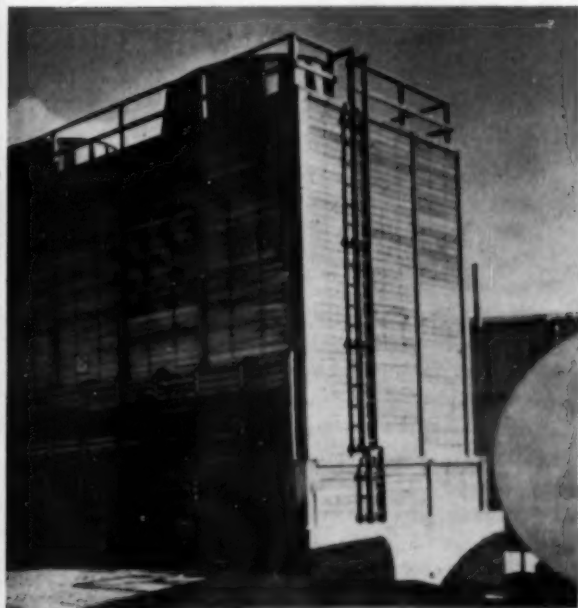


to 8,689. Detailed monthly figures for each engine in the plant are given in Table II. It should be noted that five of the six Duafuel engines have been in heavy-duty operation for periods of 12 to 18 years. The engines operate at an average load of about 80% but this does not mean that the load holds steady at that comfortable level. Large motors are always stopping and starting, picking up or dropping their load. Thus, the average load for the year was 6,145 kw, but hourly peaks ran to 7,260 and momentary peaks to a lofty 11,960 kw. The company derives one additional dividend from operation of its power plant. Exhaust gases from all but the latest Nordberg pass through waste heat boilers where they heat water used in the refining of potash.

Natural gas, the plant's principal fuel, comes in at 35 psig., is metered and then regulated to 12 psig. At this pressure it goes to the 3-stage compressor driven off the engine crankshaft where it is raised to 1150 psig. for injection into the cylinders. There is an individual meter and also a temperature gauge on gas for each engine. The 27 gravity fuel oil used as pilot oil is brought in by truck and stored in two tanks with combined capacity of 50,000 gal. Another two tanks provide 40,000 gal. storage for the 22 gravity fuel oil used in the oil-burning diesels. All four tanks are fitted with heating coils through which engine jacket water is circulated. From storage, fuel oil is transferred by a pair of motor-driven centrifugal pumps to a centrifuge, then through duplex waste-packed filters to an overhead supply tank from which it flows by gravity to the engines.

Cooling water for all but the newest engine is circulated by six motor-driven centrifugal pumps through engine jackets and coils in two induced draft cooling towers. It was found more convenient to tie the big engine in with the lube cooling system. A pair of motor-driven centrifugals pump water through oil coolers for all the engines, a heat exchanger serving the big engine, and a third induced-draft tower. Water in a large surge tank

Marley towers handle cooling water. Two at left have coils through which jacket water for seven engines circulates. Third serves all lube oil coolers and big engine's jacket water.



**TABLE II
ENGINE HOURS OPERATED**

Month	Oil Engines			Nordberg Duafuel Engines				
	#2	#3	#4	#5	#6	#7	#8	#9
1953								
July	2	126	734	735	725	734	730	741
August	4	43	740	736	740	735	732	723
September	0	53	718	709	712	710	700	720
October	0	75	736	742	730	729	735	726
November	9	68	713	708	709	710	708	712
December	0	59	742	730	737	740	732	722
1954								
January	4	46	736	729	742	739	744	724
February	4	44	669	668	665	662	668	658
March	0	55	740	735	726	732	736	744
April	13	107	717	693	711	709	702	706
May	1	48	737	743	738	724	728	744
June	0	77	707	702	716	698	719	709
Totals	37	801	8,689	8,630	8,651	8,622	8,634	8,629

floats on the suction of the circulating pumps providing a thermal syphon effect and reducing power requirements.

Lubricating oil for each of the Nordbergs is circulated under pressure to the bearings by an engine-driven pump. A motor-driven before-and-after pump is arranged to start automatically if the main lube pump fails. Besides a full-flow strainer, lube is cleaned continuously in an activated clay purifier, which draws some oil from the pressure side of the strainer, cleans it and returns it to the sump. Lube is supplied to the cylinders by mechanical lubricators, an individual unit for each cylinder in the case of the big Nordbergs.

Scavenging air for the big two-cycle engine is drawn through an automatic self-cleaning filter to a 15,700 cfm. blower which supplies air to the intake header. The blower is driven by a 300 hp. motor powered directly from the generator of the engine served. To keep the engines in condition to meet the normal heavy demands, PCA operating engineers perform scheduled preventive maintenance. But obviously, this maintenance work cannot keep the engines out of service many hours in a year. After all, they run 98.6% of the time.

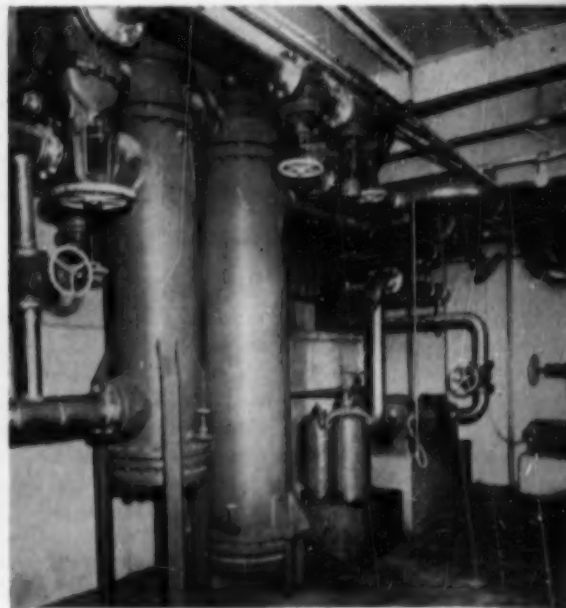
American Multi-Duty air filter is in concrete housing. Exhaust gases vent through Burgess snubber. Foster-Wheeler waste heat boilers are in background.



List of Equipment

Engine—3400 hp., 21½ in. bore, 31 in. stroke, 225 rpm., gas-burning Duafuel diesel—Nordberg.
Generator—Westinghouse.
Governor—Woodward.
Blower—Elliott.
Air filter—American Air Filter.
Fuel oil centrifuge—DeLaval.
Fuel filters—Nugent.
Pilot oil pumps—American Bosch.
Gas meters—Metric.
Gas temperature gauge—Bristol.
Auxiliary lube pump—Blackmer.
Cylinder lubricators—Manzel.
Lube cooler—Kewanee-Ross.
Lube purifier—Honan-Crane.
Cooling water pumps—Allis-Chalmers.
Heat exchanger—Kewanee-Ross.
Cooling tower—Marley.
Exhaust snubber—Burgess-Manning.
Lube strainer—Nordberg.
Gauge board—Nordberg.
Alarm system—Viking.
Exhaust pyrometer—Alnor.
Gauges—Loneragan.
Water temperature regulator—Fulton Syphon.

Accessories on big Nordberg include Ross lube cooler and heat exchanger, Nordberg lube strainer, Blackmer auxiliary lube pump, and Fulton-Syphon water temperature regulator.



GAS TURBINES MAKE HISTORY

Union Pacific Pioneers New Railroad Motive Power; Performance of Diesel and Gas Turbines Sounds Death Knell for Steamers

by E. F. A. MANN

Locomotive No. 52 was one of the first of the 25 gas turbine electrics delivered to Union Pacific. They are giving an excellent account of themselves in rugged terrain. Photo was made in Wasatch Mountains of Utah.

EDITOR'S NOTE: The Union Pacific Railroad placed the largest order on record for diesel locomotives in 1952 and shortly thereafter also ordered 25 gas turbine electric engines. Now, after several years of experience in operating steam, diesel, and gas turbine locomotives, the record has been revealed to our Mr. Mann. He has dug deeply into facts and figures and gives you the first complete story on this pioneering effort in motive power. His report will appear in three successive issues of **DIESEL PROGRESS**. Here is the first article.

WHY did Union Pacific plunge so heavily into gas turbine power when it went all-out for diesels on the biggest scale in U. S. railroad history? (See **DIESEL PROGRESS**, February, 1951.) This question, and dozens more, have given rise to a terrific amount of speculation and talk in the past three years.

The cold fact remains that after the first test runs of a gas turbine locomotive in 1950, followed by trials with an improved model in 1951, the Union Pacific ordered 10 production-line identical 4500 hp. units from General Electric. They started coming on the line in early 1952. Almost coincidental with their big orders for diesels, they ordered another 15 with improvements. Why? The answer to this question covers a lot of territory.

The background that sparked this business of taking off in two directions simultaneously, un-

heard of in world railroad history, can first be visualized by studying the UP main line anywhere between Ogden, Utah, and Cheyenne, Wyo. Any day of the year, "normal traffic" is between 100 and 150 trains a day over this route! One of the world's great parades of motive power passes with clocklike regularity over this Bridge Route that connects three points on the Pacific Coast. Los Angeles and the Pacific Northwest are connected by the UP's own lines at Salt Lake, Ogden and Green River. The San Francisco Bay area is connected via the Southern Pacific at Ogden,—and thereby gains access to all points east at Omaha and Cheyenne. And from the latter point, traffic goes south via Denver, and east via Denver and Kansas City.

Traffic piles up at both ends of the 1000-mile UP Bridge Route. The double-tracked Ogden-Cheyenne section (482 miles long) is the bottleneck. It takes the heaviest traffic flow and crosses the main sub-ranges of the Rockies, varying in elevation up to 8013 ft. at Sherman Summit, Wyo., highest point on the line. The world's greatest fruit and vegetable movement crosses here, too. So, this 482 miles has become the laboratory for world motive power. The endless parade of surviving Big Boy, Challenger and 800 Class pas-

senger steamers, still practically new, play tag with the giant new fleet of EMD diesels of all types. And now the gas turbine fleet of 25 is in the parade too! It takes nearly 200 of the 4500 hp. diesel and turbine plus 5000-6000-7000 hp. steamers to work this terrific railroad bottleneck route! The UP today is doing with its gas turbine fleet, worked into its older fleet, what Santa Fe did with the world's first diesel freight power in 1941. A second factor concerns historical facts peculiar alone to UP. The UP was America's first western land grant line, pioneering on a shoestring into the empty West after the Civil War. To power its locomotives, it quickly had to turn from wood to coal. It found coal in overwhelming quantities on its own land. A kindly Mother Nature put this coal largely on the roof of America in Wyoming and southeastern Idaho,—centrally located in the UP system. So Union Pacific did more to build up steam power, size, and efficiency than competitors, and, consequently, UP hung onto its steam power longer than anyone else before turning to diesels. When it did turn to diesels, finally, UP went almost overboard, as was reported by us in this magazine three years ago.

Unlike the Santa Fe, with a big load to haul and



even rougher topography, Union Pacific (almost the first to nibble at diesels back in 1934) turned its back on diesel and began a period of watchful waiting. History shows that it is Union Pacific policy to buy a few of the first of everything, then generally wait a few years before doing extensive buying. It actually bought the very first modern diesel locomotive type—the historic M-10,000—with a Winton distillate engine, even before the Burlington came out with its first EMD-Winton diesel locomotives.

Another important link in the chain of events is the fact that oil in large quantities was discovered over a wide area of the land under Union Pacific ownership. So part of its management has been deeply concerned with oil, and with refining fuel to burn under boilers and in diesels. Yet UP owns not a single refinery but buys from a wide assortment of producers, many of whom do not ship a pound of freight on the UP railroad!

These, then, are the potent factors tied into the total management picture of the Union Pacific System: (a) heavy traffic; (b) a magnificent, fast, heavy-duty roadbed; (c) long experience in owning, mining, and using its own coal, and, (d) a deep financial interest in the production and

marketing of petroleum products as a primary owner of oil wells. Furthermore, action based on this background is influenced by the company's thinking for the past 50 years which has been never to be satisfied with anything—just keep hunting for something bigger and better.

Because it is a wealthy railroad, and because it is pressed by the four factors that keep it forever searching for a faster way to move its endless tonnage, it is natural that the Swiss Brown-Boveri gas turbine of 1941 would have two lures for Union Pacific. It might be able to burn low-grade residual fuel oils, of which there is a tremendous quantity in Union Pacific territory. And it might someday salvage its huge unmined stockpile of costly coal in a powdered coal-fired turbine. (UP at one time burned nothing in steamers but black oil on its Northwest and California lines, now 100% converted to diesel.)

Before the English system received its Metropolitan Vickers turbine locomotive in 1952, the Brown-Boveri unit was already being tested on the Western Region railroads of England in 1949. The Union Pacific tests of the original Alco-GE gas turbine job in 1950 thus came between those of the English road models.

When you delve into Union Pacific's official thinking, the impetus for its sensational plunge into gas turbines appears simple. First, UP officials have always fretted under the high prices of diesel fuel, particularly when prices almost tripled right after the diesel locomotive got underway. Second, the constant heavy cost of lubricating oil for diesel locomotives that now seems to have stabilized to a relatively constant cost factor. Third, it is one of the world's few railroads ideally situated to make fullest possible use of the inherent advantages of the gas turbine yet provide a practical operating backdrop that minimizes the latent defects of operation of gas turbine locomotives at this stage.

No railroad can afford a specialized type of locomotive with the restrictions governing the gas turbine if it has comparatively few daily trains and long intervals of no traffic. Idle turbine time is costly. To be economically feasible, a turbine must pull full loads at top power output as many hours a day as possible. Idling runs it straight into red ink at approximately \$25 per hour. Quantities of fuel burned in the gas turbine require a minimum factor of storage and handling to make it economic.

UP officials made a long and comprehensive study of the American locomotive fuel costs. They surveyed past and future price structures in coal, heavy oil and diesel. They made a diligent search to find new uses for the great quantities of heavy residual fuel oils that are a product of many refineries on their western lines, but which find little market due to cheap natural gas competition. Only then did the company decide that the gas turbine, for its particular (and peculiar) setup, was the next logical move for it to make.

Almost simultaneously with the company's decision to go heavily into the gas turbine, it placed several large orders for all types of diesel motive power, and began a complete division by division concentration on the diesel and total elimination of steam. It literally went two ways at once: placed the largest order in U.S. diesel history for diesel locomotives at the same time it placed the largest order in world history for gas turbine power!

As 1954 ended, remaining units of its once huge fleet of steam locomotives had been pushed back to the very newest classes of the most efficient units. These largely include the Big Boy 4000 class (4-8-4), 3900 Challenger Class (4-6-4), and 800 Class passenger steamers. All less than 10 years old. They also are keeping a few of their two types of 3-cylinder Union Pacific Class. These have the largest and longest wheelbase of any steamers ever built. All except the big new steamers are generally ending their days in the flat country east of the Rockies, where water supply and fast track permit efficient usage. Heavy use of diesel is made in all regions of the system. No more steam power is being purchased and existing units may be gone within four years.

It is clearly obvious the Union Pacific intends to go as far and as fast with both gas turbine and diesel as it possibly can. Some American diesel boosters have gotten cold chills from this announcement of policy, but after you examine the total picture, it can be said that Union Pacific will

remain one of the three or four largest diesel users in America for the rest of the century.

Following extensive tests with the original Alco-General Electric turbine, an initial order was placed for 10 4500 hp. units, to burn Bunker C fuel, and to deliver the same approximate output as the standard EMD 3-unit diesel used throughout the system. The first of this order went in service in February, 1952. There is a single cab 83½ ft. long. There are eight motored axles, giving 100% of the total weight of 550,000 lbs. on drivers (fully loaded with supplies). There was to be sufficient output to pull an 80-85 car, 4100-4400 ton freight train without helper over mountainous profile of the 482-mile route between Ogden, Utah, and Cheyenne, Wyo. The same approximate average speeds were to be maintained as with standard UP diesel operation or with the Big Boy 4000 class articulated steamers, all of which run in a pool between these two points.

Tests on No. 50, the original model, were good enough to warrant ordering 10. While other U.S. roads feared the very high axle weights, the Union Pacific had full confidence in its magnificent roadbeds, with heavy steel, rock ballast, easy curves, and practically no grades in excess of 1.25%. The only thing left to the professional U.S. motive power worriers was the fact that occasionally it gets hot in the summer and the UP locomotives constantly operate in the worst American territory from the standpoint of high altitude. The entire operation is between elevation 4300 and 8013 ft.

It was this particular point that converted this writer away from any preconceived hostilities to the gas turbine locomotive acquired as a pioneer diesel man from World War I days up on the Puget Sound waterfront. Later on in this story we shall give a brief account of a trip aboard two of the turbine jobs. The very first hill we climbed was wet and greasy-rail all the way. A rare rain-storm was just ahead. The turbine seemed awfully slippery and too little weight on the rail for the total turbine power output, at full throttle. Actually this is a tremendous advantage because the

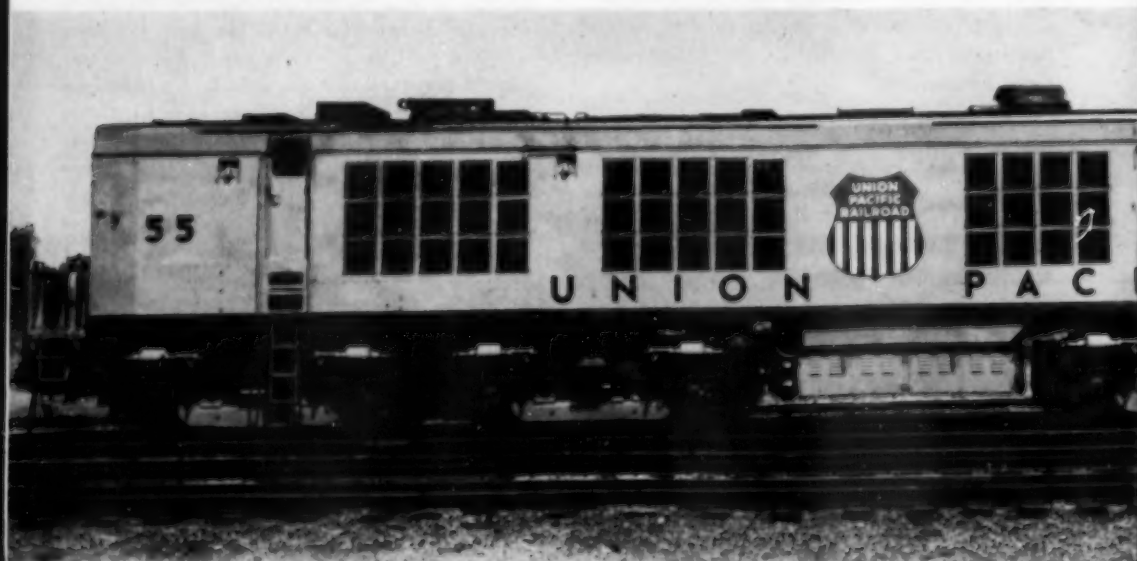
turbine normally can spin the wheels at starting or on wet track on a hill. Its excess capacity compensates for the handicaps against it due to dry air, high altitude, high summer temperatures, and not quite enough weight for total horsepower. There is exceptional reserve turbine power to offset the adverse factors at every point. Actually, with the optimum output and efficiency from a turbine arising when the air is dense and cold, and operated as near sea level as possible, the region through which the Union Pacific fleet operates has its seasonal compensations to boost the yearly average performance perhaps higher than in almost any part of North America. The reason is simply that while the region does get sunshine and hot spells, it also has terrific winds, bitter cold and heavy blizzards, bringing the longest periods of absolutely dry rail to be found on the continent. The typical Wyoming blizzard is so fine and sharp grained that the dry powdery crystals on frozen steel rail form the most perfect of winter traction.

It is these and innumerable other factors dug up by the research department of Union Pacific, backed by their able management staff in Omaha and shrewd financial staff in New York, that led Union Pacific to pioneer the gas turbine on a large scale with every promise of success. For details on the gas turbine locomotives themselves, see Table I which gives general specifications. A List of Equipment, which accompanies the concluding article in this series, gives more details about specific major equipment in the cab. The running gear consists of four 2-axle, swing-bolster swivel trucks, with a span bolster applied to each two trucks. All axles carry 4-pole series motors rated at 550 hp. 1085 amps. and operating at 900 volts. The motors are forced-air ventilated by four axial flow vertical fans mounted in the cab. Gear ratio is 18-to-74, giving a maximum speed of 65 mph.

The entire frame, which rides on the two pairs of trucks and the two-span (connecting) bolsters, is actually a double bottom tank, with flat platform on top for carrying the entire equipment and turbine load. The hollow tank spaces are for fuel, turbine residual fuel and water. They are piped

Location of equipment is shown in this schematic elevation drawing of the gas turbine locomotives built by General Electric for the UP.

One of the original 10 GE gas turbine electric freight locomotives, showing the enclosed catwalks, modified in later models.



Air for combustion, at the rate of 80,000 cu. ft. per minute, enters the compressor at outside air pressure, and leaves at approximately 80 lbs. per sq. in. at 500°f. From the compressor, air enters a series of six combustion chambers arranged around the perimeter of the first stage nozzle blading. The combustion chambers are of special alloy steel, the inner layer being perforated to receive the combustion air, which both cools the burner shells and dilutes the high temperature of the burned fuel flame. Fuel is fed through a 16-cylinder, wobble plate Sundstrand pump. Complex controls interlock with the throttle and feed at a pressure of 400 lbs. per sq. in.

Schematic floor plan arrangement. Crews are comfortable and can converse in normal tones. Main turbine delivers 4500 hp. for traction.

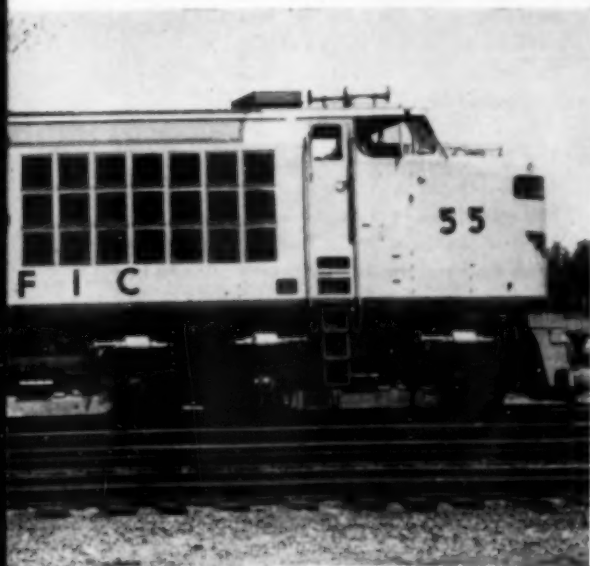


Table 1

General Specifications
Union Pacific Gas Turbine Locomotives
Wheel Arrangement B-B-B-B

Weights

On drivers (approx. $\frac{2}{3}$ supplies)—520,000 lbs.
Per driving axle (approx. $\frac{2}{3}$ supplies)—65,000
lbs.
Per driving axle (maximum)—71,800 lbs.

Dimensions

Track gauge—4 ft. 8½ in.
Length, inside coupler knuckles—83 ft. 6¼ in.
Height, roof sheets—14 ft. 5½ in.
Height, maximum—15 ft. 7 in.
Width, maximum—10 ft. ¾ in.
Rigid wheel base, trucks—9 ft. 4 in.
Wheelbase, total—68 ft. 1 in.
Wheel diameter—40 in.
Clearance under gear case—4½ in. above railtop.
Track curvature (min. rad.)—274 ft. 21°.

Ratings

Total turbine input to generators for traction—4500 hp.
(80°f. at 1500 ft. altitude.)
Continuous tractive effort—105,000 lbs. at 12.9 mph.
Maximum tractive effort at 25% adhesion—130,000 lbs.
Maximum speed—65 mph.
Gearing—74/18.

Supplies capacity:

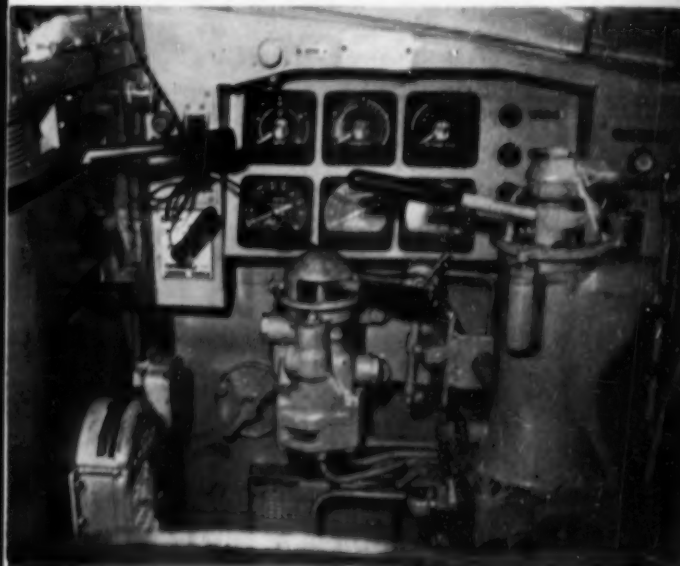
Bunker C fuel oil—7200 gallons.
Diesel fuel oil—1000 gallons.
Lubricating oil—300 gallons.

Water:

Cooling—145 gal. diesel radiator system.
Boiler—700 gal. boiler heating system.
—37 cu. ft.
ing air—100,000 cu. in.

NOTE: Gas turbine locomotives provide 53 hp. per foot of length against 30 hp per foot for diesel; 17.5 hp. per ton on drivers vs. 12.5 hp. per ton on drivers in the diesels.

The engineer's operating station is the same on all 25 of the Union Pacific's pioneer fleet of gas turbine freight engines.





Since being repowered with two 385-hp. Fairbanks-Morse diesel engines, the 260-ft. inland waterways tanker "Tydol" can carry 30,000 gallons additional cargo at increased speeds.

"TYDOL" REPOWERED

SINCE being repowered with two 385-hp. Fairbanks-Morse marine diesel engines, the 16,000-bbl. motor tanker M/V *Tydol* has increased her cargo-carrying capacity by 30,000 gallons and her speed by approximately 2 mph. Operated by Tide Water Associated Oil Co.'s eastern marine department, she has cut up to 4½ hours off her former running time between her port of Bayonne, N. J., and Bridgeport, Conn. Despite her extra speed, she burns no more fuel oil per trip than she did when powered by two 350-hp. air-injection type diesel engines.

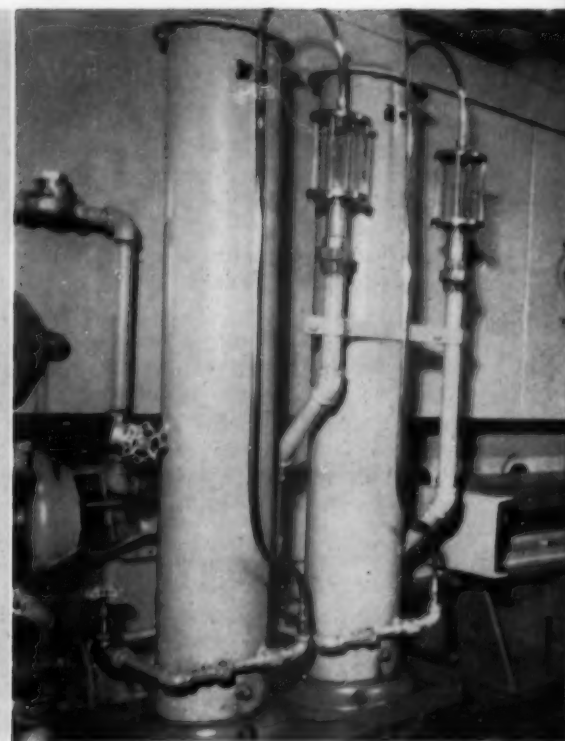
In the past the 260-ft. *Tydol* averaged 7.1 mph. between the company's Bayonne refinery and Bridgeport and required 20 hours, 5 minutes to complete each trip. Today, with her twin model 31A8½ Fairbanks-Morse diesels giving her greater horsepower and lighter weight, the vessel can carry 4% more cargo at an average loaded speed of 9.41 mph. She now requires only 15 hours, 40 minutes to complete the same trip. Despite her higher speed and greater cargo-carrying capacity, the *Tydol* consumes no more fuel oil per trip than she did with her smaller, less powerful engines. This is due in part to improved efficiency and in part to the fact that her running time has been cut, in some cases by more than 21%. On the 144-mile Bayonne-Bridgeport run, for example, the *Tydol's* two Fairbanks-Morse diesels consume an average of .38 lb. of fuel per bhp., representing a combined total of 17.29 bbls. at full load. This is actually less than the combined fuel consumption of her old diesel engines for the same but slower trip.

The tanker was originally built in 1927 by Sun

Shipbuilding & Dry Dock Co., Chester, Pa., and was rebuilt during World War II at the old Robbins Drydock yard in Brooklyn, N. Y., now owned by Todd Shipyards Corp. At that time she was reconditioned and her old cargo tank section replaced. Repowered early last summer, she left on her first voyage with her new engines on July 1, 1953. The *Tydol* measures 260 ft. in over-all length, has a beam of 40 ft., a depth of 14 ft. and a mean draft of 12 ft., 6 in. Her gross tonnage is registered at 1257 and her net tonnage at 768. She has an all-steel hull which is welded in way of the cargo tanks and riveted at the fore and aft ends. Her twin screws and twin rudders give her maximum maneuverability.

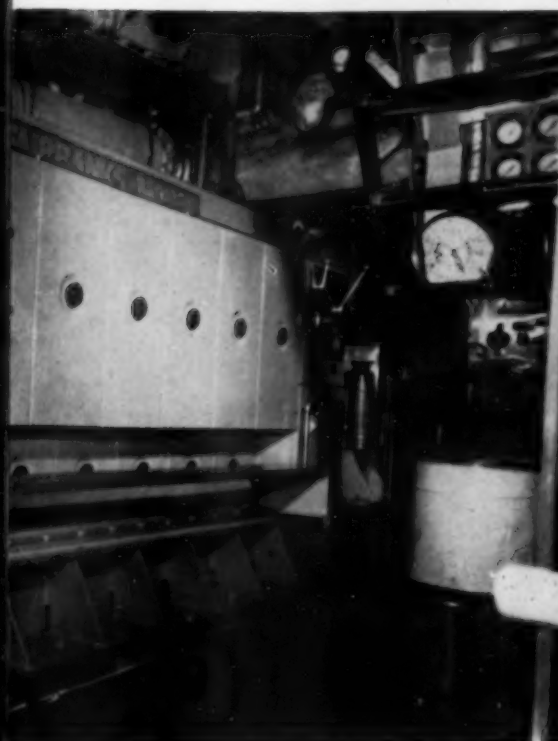
In normal operation the inland-waterways tanker operates throughout New York harbor, up the Hudson river as far as Albany and over Long Island Sound to Bridgeport, Conn., Providence, R. I., and Fall River, Mass. She loads up at Tide Water's Bayonne plant and carries 16,000 bbls., or 672,000 gallons, of gasoline, kerosene, fuel oil or other petroleum products. She can also carry such packaged goods as grease and lube oil. The *Tydol's* three 8-in. main cargo pumps can unload her cargo tanks in from five to six hours. Rated at 525 gpm. each at 300 rpm., they are rotary-type units operating against head pressures of 100 psi. Each is driven via a shaft and flexible coupling by a 50-hp., 300 rpm., dc. electric motor.

To arrive at an accurate fuel consumption average for the two Fairbanks-Morse main engines, the *Tydol's* operators on Nov. 7, 1953, conducted a special test run of the vessel under loaded conditions between Bayonne and Bridgeport, a dis-

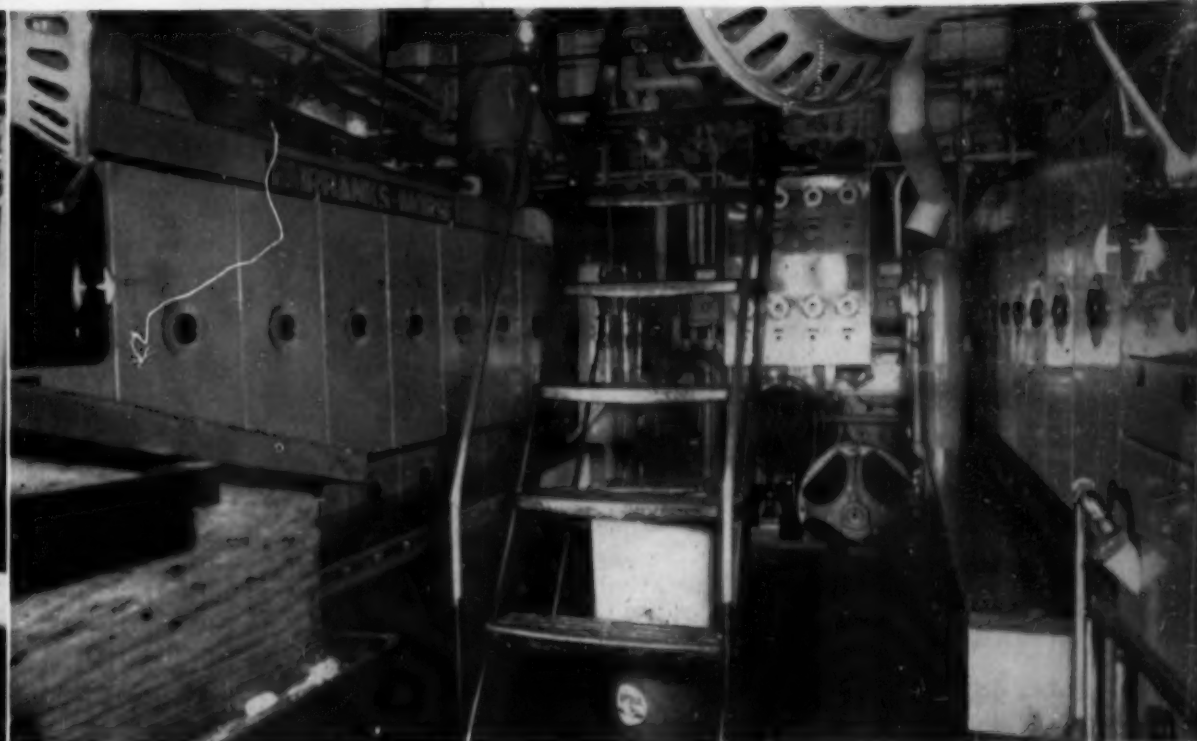


tance of 144 miles. The test was made necessary by the fact that both the main engines and the two Worthington diesel-generator sets installed are connected to the same fuel oil storage tanks, with no meters provided to indicate how much fuel is used by each engine. The test was arranged not only to check fuel consumption but to relate engine speed to brake horsepower under actual running conditions. For the purposes of the test a special fuel oil tank was provided for the two Fairbanks-Morse engines, containing a predetermined amount of fuel. The diesel-generators, meanwhile, were run off the existing storage tanks. Averaging a speed of 9.41 mph. at full load throughout the trip, the M/V *Tydol* covered the 144 miles in 15 hours, 40 minutes. Both of her main engines operated at 520 rpm., the port engine delivering 442 bhp. at this speed and the starboard engine 446 bhp. Fuel consumption for the port engine averaged 23.1 gallons per hour and for the starboard engine 23.3 gallons per hour. Since a gallon of the No. 2 diesel oil used weighs 7.278 lbs., this represents an average for each engine of 168.1 lbs./hr. and 169.5 lbs./hr., respectively, or 0.38 lb. per bhp. for both engines combined. Total fuel consumption at these figures would be 17.29 barrels.

The test can be taken as representative of the day-to-day performance of the two Fairbanks-Morse engines because it was run over a route regularly followed by the *Tydol*, it was run under a full load and the only alteration allowed in the regular routine was to provide a special fuel tank for the two main engines. Otherwise everything was maintained exactly as it would be in normal operation. The two Fairbanks-Morse marine diesel engines are rated at from 385 to 455 hp. each at engine speeds of from 514 to 525 rpm. They are 2-cycle model 31A8½ units, each having 7 cylinders of 8½-in. bore and 27-in. stroke. On the *Tydol* they drive twin 78 by 57 propellers through direct-reversing reduction



Control-side view of the "Tydol's" starboard engine, showing Luber-finer lube oil filters and one of the Weston tachometers



Looking forward in the engine room. Port and starboard are the "Tydol's" completely enclosed 385-455-hp., 514-525 r.p.m. Fairbanks-Morse main propulsion engines. Also shown are Alnor pyrometers, Luber-finer filters and a 50-hp. Westinghouse motor which drives one of the three main cargo pumps

gears of 1.97:1 ratio. From the wing tanks the two Fairbanks-Morse main propulsion engines pick up fuel by means of built-in, engine-driven supply pumps. Passing first through a duplex strainer on the suction side of each pump, the fuel reaches the engines through duplex, bag-type filters. It then goes to the individual injection pumps and nozzles for each cylinder.

A high detergent type lube oil (the company's Tycol Adeltran 30) is stored in a 250-gallon storage tank which serves the main engines exclusively. It is circulated under pressure to the pistons and cylinders by means of built-in, gear-type pumps, passing through a full-flow strainer on each unit. A similar pump circulates lube from the sump through a 6-cartridge, cellulose-packed, by-pass filter, which maintains it in excellent condition at all times. Samples are periodically sent to Tide Water's own laboratory at Bayonne for careful examination and analysis. The lube is cooled in individual shell-and-tube coolers installed in upper engine room space; by-pass valves keep it at the desired temperature.

Built-in, engine-driven fresh water pumps circulate jacket water through the engines and through shell-and-tube type heat exchangers, also installed in upper engine room space. These, too, are equipped with hand-operated by-pass valves. Sea water is circulated as a cooling medium through the lube and jacket water heat exchangers by means of built-in pumps similar to the fresh water pumps on each engine. In cold winter months the warm sea water discharge is recirculated around the icy incoming water, thus raising the temperature of the water before it reaches the heat exchangers.

A balanced, oscillating type, positive displace-

ment blower is built into each engine block and supplies scavenging air to the cylinders. Driven off the forward end of the crankshaft, it draws air through an oil-bath type filter mounted top-side on the poop deck. Starting air is supplied by a built-in, single stage air compressor on each engine, with the same type of drive as the scavenging air blowers. Exhaust gases are expelled through individual, spark-arrester, vertical silencers, located in the upper engine room. The vessel has no stack, the gases reaching the atmosphere through vertical pipes on the poop deck.

Separate gauge panels serve each engine, equipped with gauges on fuel pressures both before and after the strainers, inlet and outlet lube pressure, scavenging air pressure and fresh and salt water pressures. Visual and audible alarms are provided on lube oil pressure and temperature and on fresh water temperature. Individual tachometers are installed on each engine, mounted directly on the frame. Two gauge panels which formerly served the old engines have been hooked in to provide an additional check on the Fairbanks-Morse units.

The two auxiliary generator sets which provide power for the main cargo pumps and for ship's service consist of two 150-bhp. Worthington diesel engines driving a pair of General Electric 100-kw., 240-volt, direct-current generators.

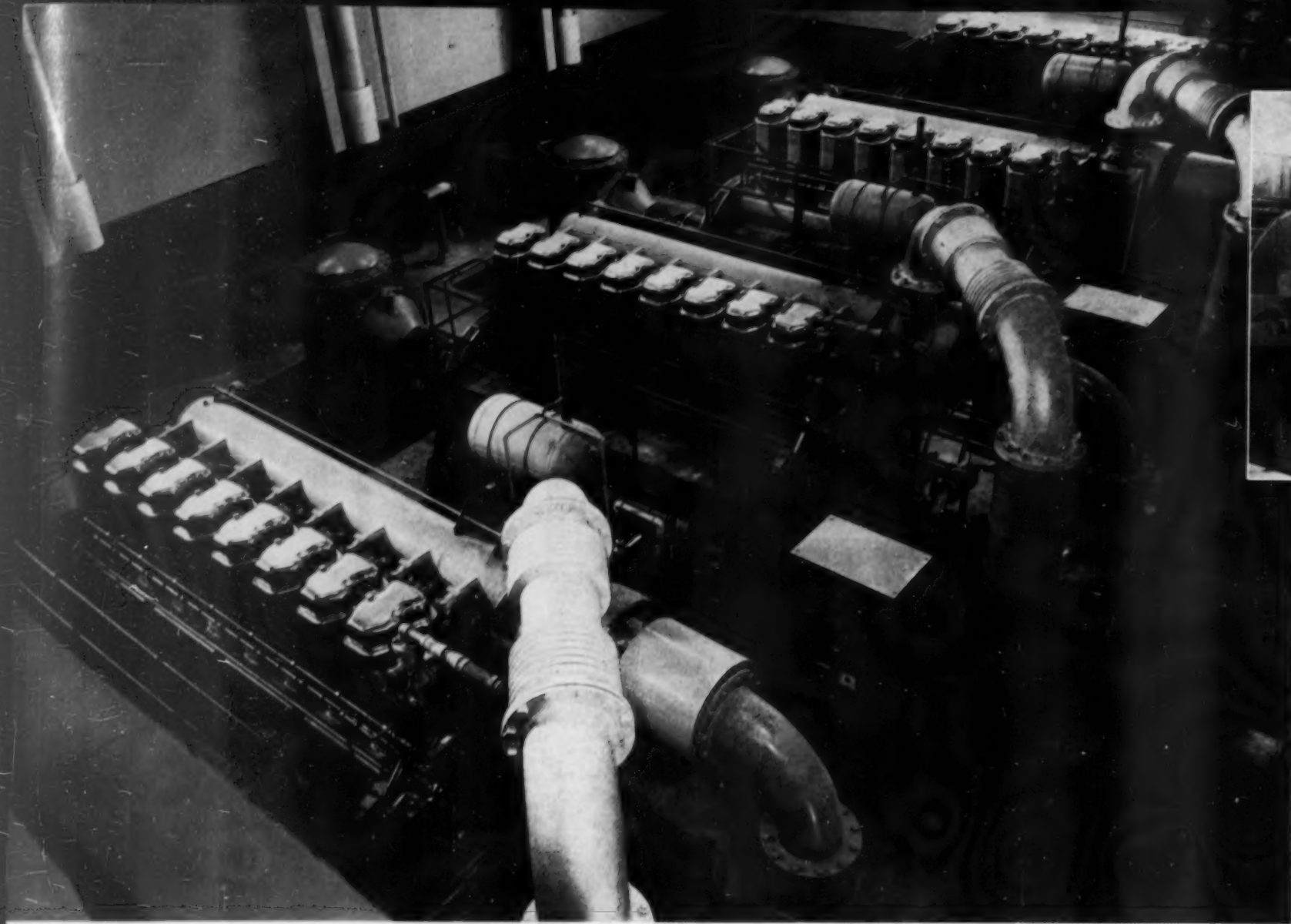
The 18-man crew on the *Tydol* includes the captain, Chief Engineer Frank C. Houghton, 1st Assistant Engineer Joseph O'Neill, 2nd Assistant Engineer Rudolph Reinhartsen, two mates, three oilers, four able-bodied seamen.

Captain Mads Olsen, who retired after 34 years, at the wheel. The *Tydol* is part of the 14-vessel Tide Water fleet.

List of Equipment

Main engines—(2) Model 31A8½, 2-cycle, 7 cylinder, 8½-in. by 11½-in., 385-455 hp., 514-525 rpm. marine diesel engines, Fairbanks-Morse.
Governors—Woodward.
Fuel-oil—Tydol, Tide Water Associated.
Fuel oil supply pumps—Fairbanks-Morse.
Fuel oil duplex filters—Purolator.
Lube oil—Tycol Adeltran 30, Tide Water Associated.
Full-flow lube oil strainers—Cuno.
Lube oil by-pass filters—Luber-finer.
Lube oil coolers—Kewanee-Ross.
Jacket water heat exchangers—Kewanee-Ross.
Air filters—Air-Maze.
Exhaust silencers—Vortex.
Tachometer—Weston.
Exhaust pyrometers—Alnor.
Auxiliary diesel-generator sets—(2) Worthington, General Electric.
Air compressor—Ingersoll-Rand.
Switchboard gauges—Weston.
Steering gear—Allan-Cunningham.
Anchor windlass—Allan-Cunningham.
Capstan—Allan-Cunningham.





Each of four Enterprise diesels in Oakland Storm Water Pumping Station has Zallea Bros. exhaust and air intake flexible connections and an Elliott turbocharger.

DIESEL-DRIVEN PUMPS PROTECT OAKLAND

Four Enterprise Engines, Connected to Wheeler-Economy Pumps, Can Remove 162,000,000 Gallons of Storm Water Each Day From City's Lowlands

By MARK OGDEN

Oakland, Calif., being such a close neighbor to fabled San Francisco, is a much larger city than most persons realize. And, like many another western city, Oakland has grown tremendously in recent years until it has become a metropolis of nearly 400,000. But unlike most other great cities, much of Oakland's industrial section has sprawled out over filled-in areas that once were marshes and tidelands. The commercial heart of the city is on flat land not much higher, while the remainder streams up the Piedmont and Berkeley hills to the east, away from the lowlands along the Bay.

Oakland's terrain and population spurt conspired with California's rainy season to present citizens with a critical need for disposal of storm waters. Oakland gets practically all of its rainfall within a 5-month period, and many of the winter storms bring heavy precipitation. As the city grew, less

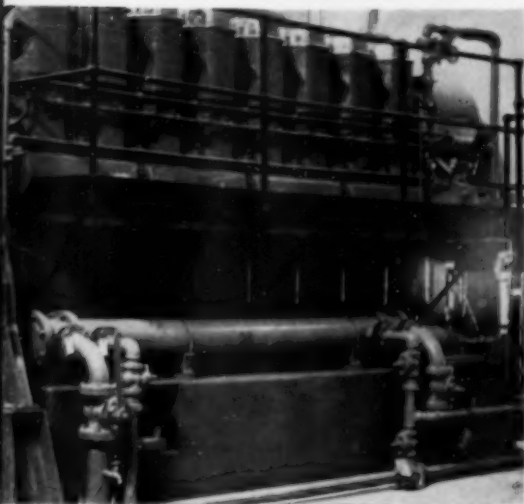
and less earth was exposed to absorb the rain. Instead, there was an ever-increasing expanse of roof, paved streets, sidewalks, and parking areas. During heavy rains, these impervious surfaces concentrate and intensify the runoff, shooting torrents of water down the hillsides. These torrents seem intent on filling homes, stores and factories located in the flatlands bordering the Bay.

In the early days, when the drainage system was laid, both sewage and storm waters flowed through it. This, obviously, was an unsatisfactory, even dangerous, method. Therefore, a comprehensive study was made of the problem in 1927. A plan was devised for a separate storm water runoff system, but voters shelved it by defeating a proposed bond issue to finance construction. With the problem growing more critical each year, a bond issue finally was approved in 1945. By that

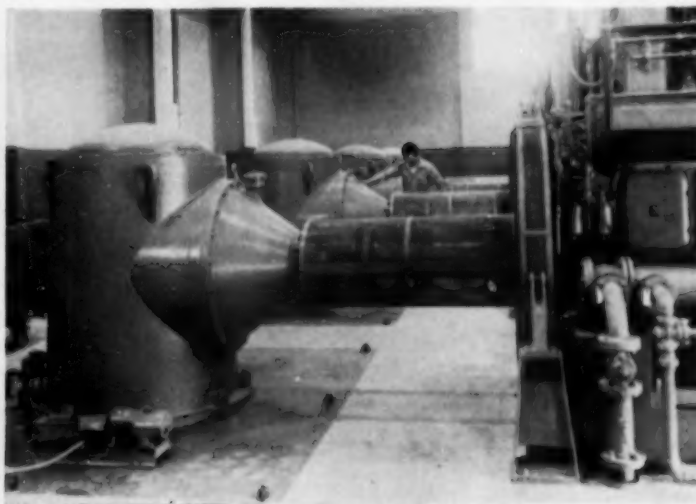
time, the problem had been altered due to the erection of several army and navy installations and construction of the East Bay Municipal Utility District sewage treatment plant. The project, therefore, was redesigned by the Oakland Engineering Dept. Consultants were Brown & Caldwell, and a University of California professor, Charles G. Hyde.

When completed, the new storm water project will have cost Oakland around \$4,600,000. It is made up of 12 different units, seven of which are finished. The units include intake and discharge lines, networks of lateral conduits, and the Oakland Storm Water Pumping Station. Conduit sizes for interceptor lines draining into the pumping plant range from 24 to 108 ins. An automobile can be driven through the largest of the concrete pipes.

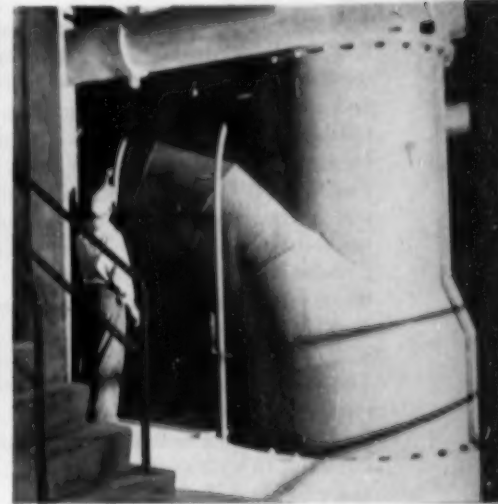
The pumping station is capable of ridding the city



In opening at left in base of engine can be seen the Korfund vibration isolator. In middle of pipe along floor is one of the 20 Amot thermostatic lube oil valves used.



Thomas flexible couplings transmit power to Pacific right angle vertical drives connected to the 112,250 gpm. Wheeler-Economy mixed flow pumps erected in the well below.



This picture gives a little indication of the huge size of the pumps and conduits. Pump inlets are 24 ft. below engine floor. Four pumps can rid city of 162,000,000 gallons a day.

of 162,000,000 gallons of storm water a day. To perform such a herculean task, four Enterprise DSG-318 diesel engines were installed. Each is rated at 1200 bhp. at 560 rpm. The bore is 12 in., the stroke, 15. Each engine is connected to a Wheeler-Economy 54x66-in., type SAFV, vertical mixed flow pump capable of 112,250 gpm. Each pump weighs approximately 20 tons.

The average head is 31 ft., with the pump inlets 24 ft., 9 in. below the engine floor. These huge pumps were manufactured in Philadelphia by the Economy Pumps Division of C. H. Wheeler Manufacturing Co., a pioneer in the development of large axial and mixed flow pumping equipment. The pumps used at Oakland were constructed of cast iron casings, bronze impellers, and alloy steel shafts.

The pumps are automatically controlled. An integration of electric and pneumatic controls start and govern the speed of each engine or combination of engines to keep pace with pumping requirements of the moment. When the need for storm water disposal arises, an initial engine begins to operate. When the amount of water to be moved forces this pump to its capacity, a second engine comes in. This process is repeated until all four engines are at work.

The station also has two 30-in. auxiliary pumps, driven by electric motors. They can handle minor runoffs of up to 30 cu. ft. per sec., each. Their use at the outset of a pumping situation provides a 2-minute interval for pre-lubrication of the first Enterprise engine scheduled to pick up the load. After all water has been pumped out of the station, the operating Enterprise idles for 15 minutes before shutting down. Thus, it is prepared for a new surge of storm water.

Jacket water temperature for each of the four diesels is controlled by Amot 4B-160 thermostat valves. They serve as mixing valves. Cold water enters the valve from one side, hot, by-pass water from the engine outlet from the other side. Mixed water at 160°F then is supplied to the engine through a vertical pipe, rising from the Amot valve.

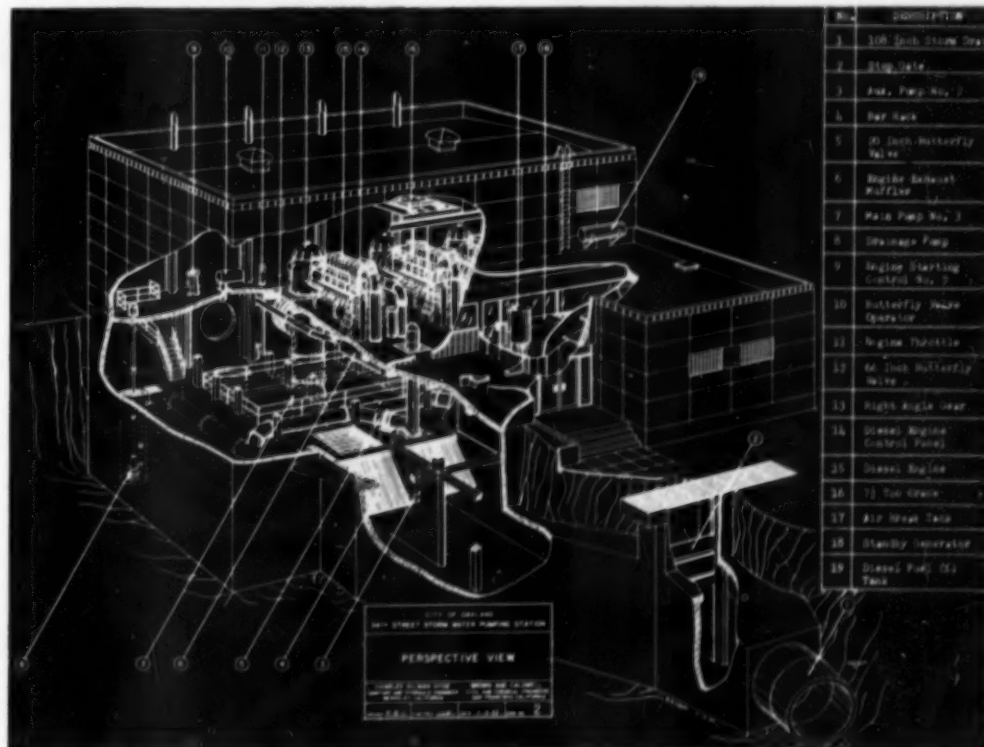
Another interesting aspect of the four-engine installation is the incorporation into the base of

each engine of Korfund vibration isolators. These are adjustable. They provide a spring cushion between the engines, which are mounted above ground level and over a basement, and the building. This mounting made the vibration isolation more difficult than normal. The Korfund Type UV-25 Vibro Isolators were designed to provide a high isolation efficiency even for vibrations generated at 560 rpm. In the Oakland installation, the suspended weight contended with was around 80,000 lbs.

List of Equipment

Engines—Enterprise DSG-318 diesels delivering 1200 bhp. at 560 rpm., bore 12; stroke 15.
Fuel injection equipment—Bendix Scintilla.
Turbochargers—Elliott.
Pumps—Wheeler-Economy mixed flow, 112,250 gpm.
Drives—Pacific Western right angle vertical.
Couplings—Thomas flexible.

Switchboards—Columbia Electric.
Switchboard instruments—Danel-Columbia.
Pneumatic engine controls—Power-Mac.
Governors—Woodward, SG-8.
Tachometer—Weston type.
Air compressor and motor—Quincy.
Air starter—Enterprise.
Fuel oil filters—Purolator, primary; Winslow, final.
Lube oil filters—Winslow model 21-1645-DS.
Lube oil cooler—Cooley.
Lube oil thermo. control valves—20 Amot 2-in.
Lube oil pressure gauge and thermometer—Marshalltown.
Exhaust and intake air flexible connections—Zalica.
Intake air filter—Vortox.
Exhaust silencer—Maxim.
Exhaust pyrometer—Alnor.
Vibration isolator—Korfund.
Jacket cooling system—open.
Cooling water pumps—Enterprise.
Jacket water control valves—Amot 4-in.



ANOTHER development in the rapidly growing application of the mechanical refrigeration technique to railroad refrigerator cars, has come out of the midwest. Fairbanks-Morse & Co., Saylor-Beall Co., and Dole Refrigeration Co., have collaborated in producing a mechanical "reefer" car for the North American Car Corp. It is being used by the Chicago & Northwestern Railroad. This new system, employing several unique features, has been applied to a car built in 1938. It formerly contained a conventional end-bunker type ice refrigerated setup. The car was converted at the North American Car shops.

The system consists essentially of a diesel-driven condensing unit and "holdover" cold plates. The Fairbanks-Morse diesel directly drives the condensing unit. This eliminates all electrical equipment and most of the electrically operated control devices found in conventional mechanical refrigeration cars. The engine and condensing equipment are installed in the space formerly occupied by one ice bunker. The other ice bunker is now available to provide approximately 10% additional cargo space.



Converted Northwestern "reefer" car, showing access door to the refrigeration machinery compartment at the left.

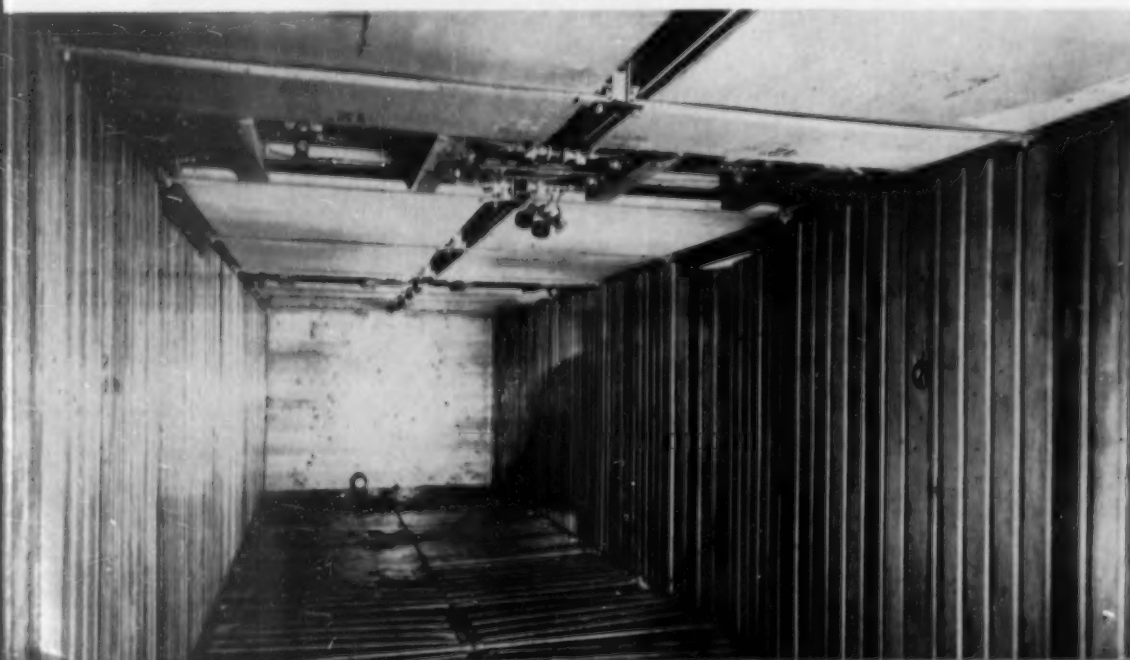
DESIGNS SIMPLE METHOD FOR CONVERTING REEFERS

**Chicago & Northwestern Gains Cargo Space,
Eliminates Electrical Equipment by Using
Diesel-Driven Compressor. Plan Is Suitable
for New Construction or for Modernizing**

Six hold-over cold plates, measuring 46x120 in. each, are located in the ceiling of the car and occupy the space formerly required for air circulation. This design is not only adaptable to new

By **BRUCE W. WADMAN**

Interior of the "reefer," showing hold-over plates in the ceiling, slatted sides down which cold air flows, and floor rack.



car construction but also lends itself readily to the conversion of existing cars with a minimum of modification and expense.

Details of operation are as follows: The condensing unit consists of the Fairbanks-Morse, 4-cycle, Model 48-AS1 diesel rated 16 hp. at 1200 rpm. driving directly, through a Twin Disc clutch, a compressor and a set of condenser fans. The compressor and the fans are belt-driven off a common shaft from the engine. The only electrical controls on the engine are for starting, actuated by a storage battery, and an engine shutdown device. The engine runs continuously at 1200 rpm. The amount of cooling required from the system is governed by varying the load on the engine through a by-pass control valve between the compressor outlet and inlet gas. This is entirely a natural air circulation system. There is no forced air circulation. The hold-over plates are angled slightly downward from the horizontal to facilitate the most efficient natural air circulation in the car.

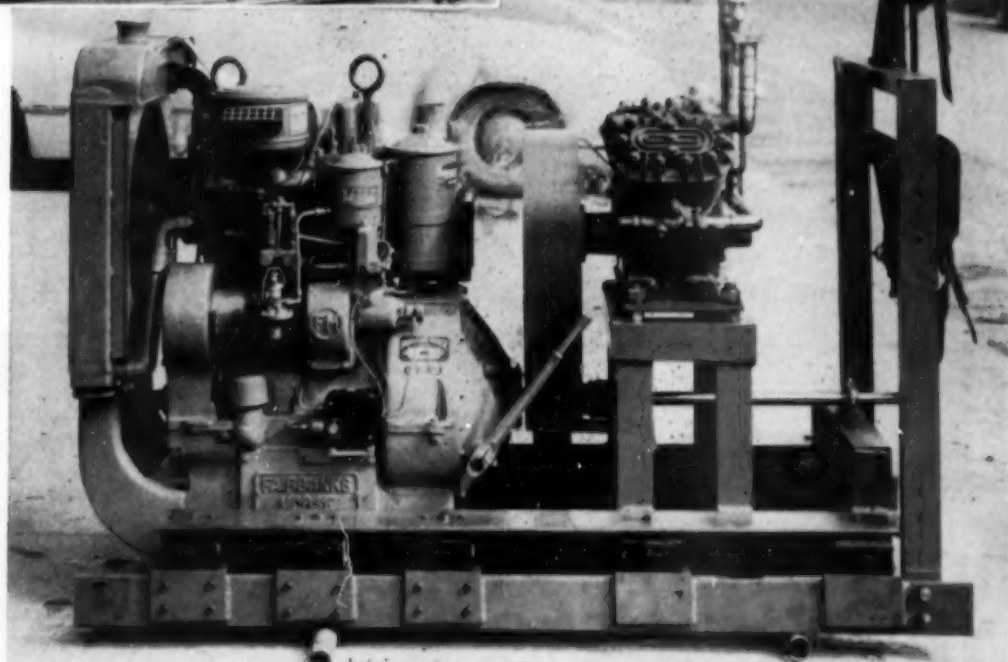
The natural air circulation cycle is attained as follows: heavy cold air flows downward, across



which freezes at -12°F . It is normally in a frozen state when the refrigeration system is operating.

This solution, which occupies a far larger volume in the plates than the gas, forms a large reservoir for heat absorption in the heat of fusion required to melt this large volume of frozen solution. Thus, it can maintain temperature within the car for a period of 8 to 24 hours if the refrigeration equipment fails. This feature alleviates the cargo spoilage problem in case of failure of the refrigeration equipment and gives time to make necessary repairs.

Fairbanks-Morse diesel compressor unit before installation. Drive is direct through a Twin Disc clutch. Note condenser fans. Brunner compressor, Air-Maze air filter, Fram lube and oil filters are accessories.



the hold-over plates. It covers the sides of the car, which are equipped with vertical wooden slats spaced one inch apart to allow for unhampered air flow. The air then goes along the bottom under floor racks to the center of the car. Aided by the property of warmed air to rise, the air completes the circuit by rising to the top of the car, having been heated by contact with the cargo. This is designed to transport refrigerated cargo at -5°F , and it will maintain this temperature within very close limits. The condensing unit automatically keeps the proper temperature in the cargo space in the following manner: the compressor runs continually and has a fixed capacity. The percentage of capacity used determines the temperature of the car, and the percentage not needed is by-passed by the control valve. The hold-over plates contain a gas (freon) as the refrigerant and a solution,

For conversion, the installation of this equipment utilizes one of the ice bunkers and space formerly taken up by ice. Modification of the sides of the car is necessary to provide the air intake for condenser cooling and for an exhaust outlet in the access door. This door gives entrance into the compartment for servicing the equipment. For ease of service, the entire unit can be removed from its location by removal of eight bolts, disconnecting refrigeration lines, fuel lines, and battery cables.

The entire condensing unit weighs 1300 lbs. fully equipped. This service feature minimizes downtime as far as the car is concerned and provides an opportunity for regular scheduled maintenance.

This new mechanical refrigeration system offers extreme simplicity. The only control, besides the engine starting and shutdown, is the valve for setting the minimum temperature to be maintained in the car. This control valve also is the by-pass control valve on the compressor. This conversion plan is to be modified to fit the needs of the meat industry, and for any other cargo requiring either refrigeration or heat.

List of Equipment

Engine—Fairbanks-Morse Model 48-AS1, 4-cycle, 2-cylinder, rated 16 hp. at 1200 rpm.

Lube oil filter—Fram.

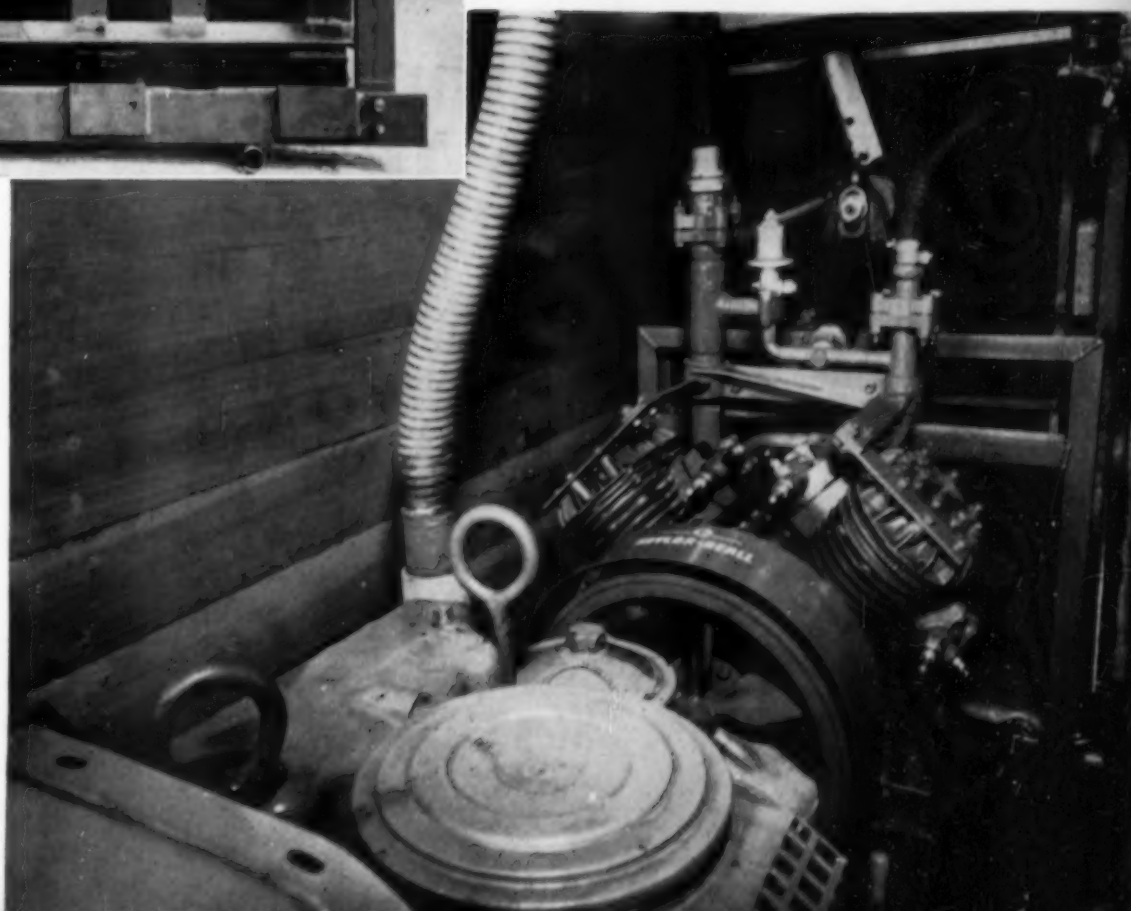
Fuel oil filter—Fram.

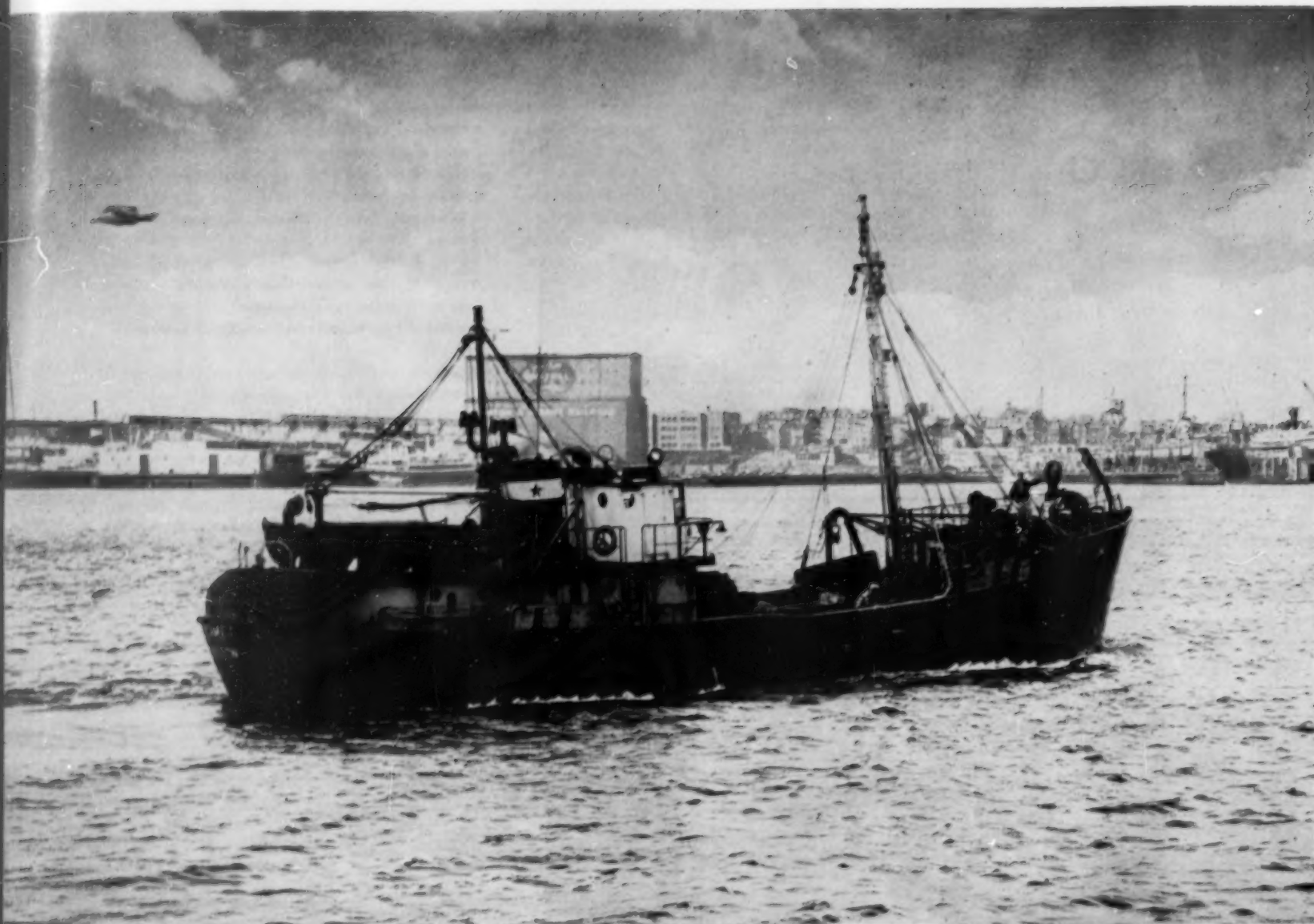
Air filter—Air-Maze.

Automatic shutdown controls for high jacket water temperature and low lube oil pressure—Penn Controls.

Clutch—Twin Disc.

Detailed view of installation. Penn automatic shutdown and by-pass control valve can be seen above the compressor.





The beam trawler, *Comet*, commissioned in Feb., 1951, is shown entering Boston harbor from rough North Atlantic fishing waters. Minimum maintenance on 500-hp. Superior diesel aids crew in making fast trips, fast port turn-arounds.

DIESELS ENABLE BEAM TRAWLERS TO FISH NORTH ATLANTIC

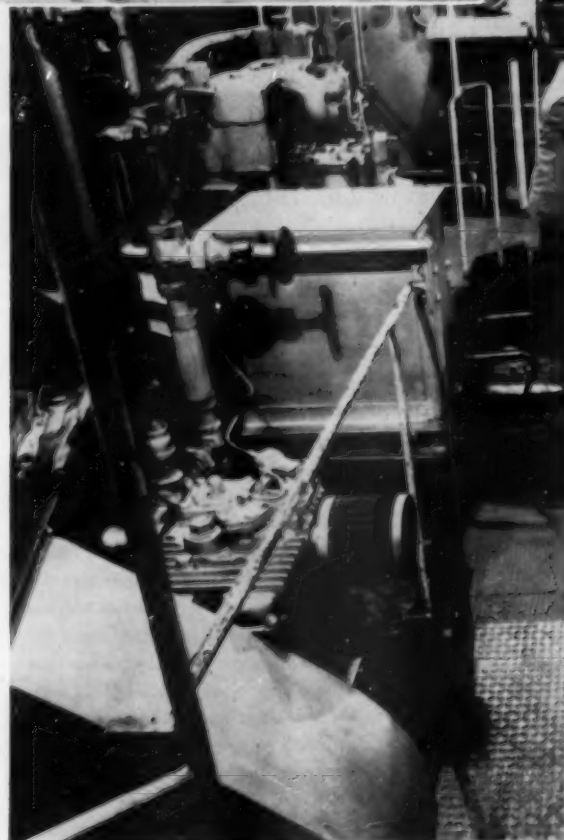
U. S. Shipbuilding Vessels Stay at Sea from 8-to-15 Days, Make 25-to-27 Trips a Year, Sailing from 250 to 750 Miles Each Voyage

By CHARLES A. WRIGHT

It is fundamental to the economics of the fishing industry that a vessel makes money when hauling in fish, not while sitting in port. Howard Francis, port engineer for the U. S. Shipbuilding Co., Boston, figures that one of his company's beam trawlers would start losing money at the rate of \$400 a day as soon as it was tied up to the dock. "My crew takes over when one of our vessels arrives

in port," he explains. "We really go to work, never resting a second until, on the third day, we have the vessel under way for another catch."

During that short interval, the payload of 100,000 to 200,000 lbs. of haddock and cod must be sold and removed from the hold, new supplies of fuel, ice, food, and water must be put aboard, and the



DIESEL PROGRESS

vessel must be made ready in all respects for another 250-to-750-mile run, lasting from 8 to 15 days. It is a rugged schedule, requiring well-built, powerful ships, as well as competent crews. "We operate our boats in the roughest part of the notoriously wicked North Atlantic," Mr. Francis says. "But our operations are not hampered, for we design our ships for these conditions. They move in all sorts of weather, keeping a constant payload coming in. We can't afford to be 'down' unnecessarily." Two of the trawlers that maintain a high average for the company's fishing fleet are the *Comet*, commissioned in February, 1951 and the *Swallow*, commissioned in February, 1952. Each measures 104 ft. from stem to stern, with a 26-ft. beam. And the main propulsion of each is by 500 hp. Superior diesel engine, operated at 400 rpm., providing a speed of 9½ knots. The engines are completely enclosed, making the operation cleaner and quieter, and also protecting the below-decks crew from hot or moving parts, a hazard in rough weather. The Model 60 Superiors have 12-in. bore and 15-in. stroke. Fuel injection pumps are by American-Bosch, and fuel service pumps are Tuthill.

Mr. Francis is well pleased with the engines, made by the engine division of the National Supply Co. "In spite of the heavy duty both vessels have seen, maintenance has been negligible, he says. In fact, the truth of the matter is that we couldn't live with an engine performance of lesser achievement. Our schedule calls for 25 to 27 trips a year. Any delay for repair or overhaul would, obviously, affect our

payload potential. We overhaul and repair our vessels about every two years, which is an excellent record, considering that some owners have them out of the water every year. We couldn't make money that way. It takes about 30 days for one of these alterations, and we would lose 300,000 to 400,000 lbs. of fish in the process."

An outstanding feature of both the *Swallow* and the *Comet* is a 2-level engine room, with the main engine on the lower level and all accessories, such as auxiliary engines and compressors, confined to the upper level. "The Superior engine is readily adaptable to this type of engine room," Mr. Francis says. "The arrangement greatly reduces the clutter that is typical of a single level engine room, in which an engineer is forced to leave his station to check his strung-out equipment. In the 2-level room, the engineer's maneuvering is limited to a small area on the upper level. He can easily check or replace engine parts by simply stepping down into the lower level. An additional convenience is that most piping is installed in the space between the upper and lower levels, thus keeping it out of the engineer's working area."

During World War II, the U. S. Shipbuilding Co. built over 300 boats of this engine room design for the Army and Navy. They were used as towboats and for carrying freight and passengers. Although the company is now principally concerned with its fishing fleet, it continues to maintain shipyards in Boston, Yonkers, and Brooklyn.

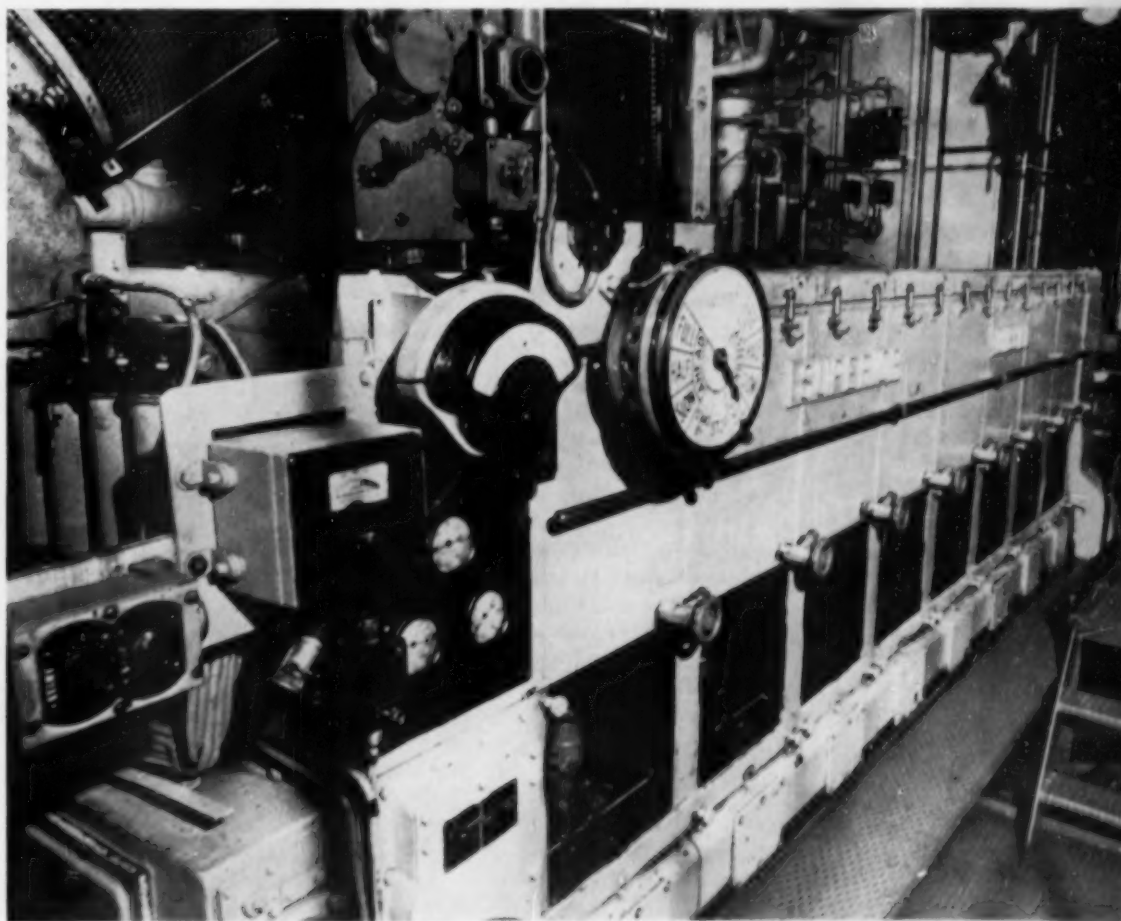
The *Comet* and the *Swallow* were built under regulations of the American Bureau of Shipping, which requires a very exacting inspection of the engines and the engine parts and installations. The Coast Guard also inspects the vessels. Both boats operate on direct drive through a 7½-in., 10-ft. shaft. The trawlers have crews of 17 each, consisting of a captain, mate, 1st and 2nd engineer, cook, and 12 crewmen. Speed and displacement of each are the same going out and coming in. Heading for the fishing grounds, each trawler carries 12,000 gallons of fuel, 6,000 gallons of water, and 40 to 50 tons of ice. The fish caught replace the weight of the fuel and water used.

"Our catch varies with the season," Mr. Francis says. "During the summer months, each of our vessels brings back about 100,000 lbs. while in the winter a catch will average 200,000 lbs. This is affected to some extent by the spawning season, during which time we must regulate the amount of fish we bring in. Also, during the winter we can stay out 14 to 15 days as compared to 6 or 8 days in other months. We fish entirely for haddock and cod, which are known as deep feeders. To bring them from the bottom we use trawl nets, raised by diesel-electric winches, that lift as much as 20,000 lbs. of fish at a time."

On an 8-day trip, each trawler uses approximately 4,000 gallons of diesel fuel. Lube oil consumption averages 20 gallons.

Feature of U. S. Shipbuilding vessels is the two-level engine room. In the *Comet*, the Superior engine is fully enclosed, making for clean, quiet operations, and eliminating hazards.

This is the engine room of the *Swallow*, sister ship of the *Comet*. Cover plates are off the Model 60 Superior engine. It is equipped with American-Bosch fuel injection and Tuthill fuel service pump. Winslow filters and the Weston tachometer show in the picture below.



LONG ODDS AGAINST POWER FAILURE



A CIVIL DEFENSE INSTALLATION

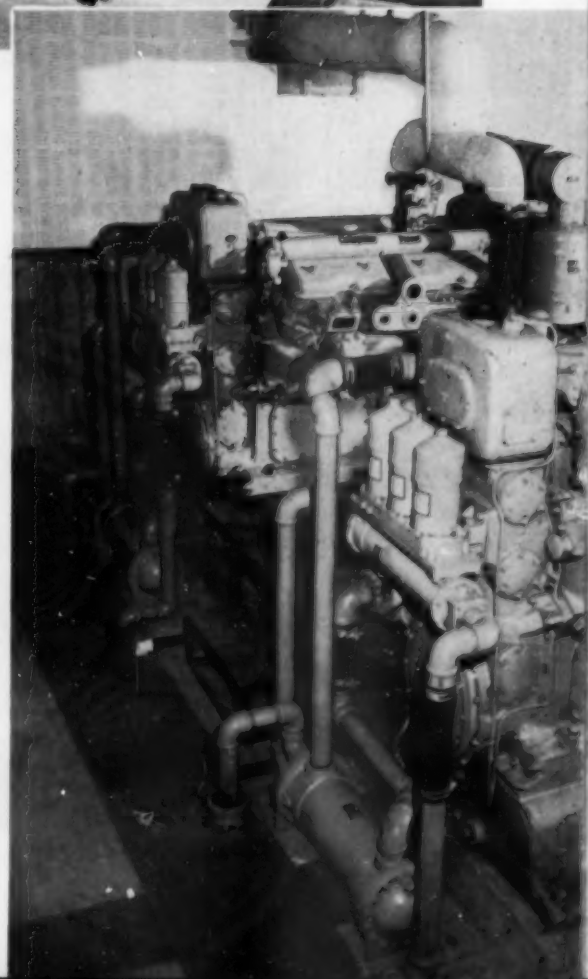
THERE are mighty long odds against electrical power failure at the beautiful Hialeah Race Course at Miami, Fla. Track owners saw to that when they installed two diesel-electric sets to protect the heart of the track—the pari-mutual machines, calculators, automatic totalisators and public address system. During the early months of 1953, plans were completed for the replacement of the 22-year-old clubhouse at the famous track. In the two years of preliminary discussions concerning this modernization project, Steve Darlington, sales engineer for Shelley Tractor & Equipment Co., had stressed the vital importance of including emergency standby equipment of adequate capacity to handle the entire track load in the event of a power failure. Lester Geisler, architect for Hialeah, had standby equipment incorporated in the specifications.

There is tremendous need at a race course such as Hialeah for uninterrupted electrical power. Should a power failure occur while the horses are on parade to the post, or during the racing day,

the track would be obliged to return all the money which had been wagered. At Hialeah, daily betting averages about \$1,000,000, of which 7% goes to the track. It is therefore imperative that reliable standby power be available at all times during a racing day.

Shelley Tractor & Equipment Co.'s quotation on two Caterpillar D575 diesel-electric sets was accepted and installation was completed on January 16, 1954, opening day at Hialeah. The equipment furnished to Hialeah for approximately \$45,000 included the diesel-electric sets, auxiliaries, switch-board equipment, generators, auxiliary water pumps, air compressor and heat exchangers. The two generators are 2-bearing Columbia ac. units, each with a direct-connected exciter. They are 262 kva., 0.8 pf., 210 kw., 480/277 volt, 4-wire, 3-phase, 60-cycle units operating at 1200 rpm.

The diesel-electric sets are installed in a separate 24x30-ft. stuccoed concrete block building about 75 ft. west of the Hialeah Race Course Clubhouse.



One engine was ordered with right-hand controls, the other with left-hand controls and a removable platform 16 inches high was built between the two units so that the operator may regulate both machines from one position.

Due to the location of the units, noise elimination is an important factor. These units are cooled with heat exchangers and electric motor driven self-priming, raw water pumps, supplying water from two wells to the heat exchangers. The waste water is discharged to storm sewer lines. Maxim MU3 residential type mufflers were installed. Engine room walls and ceiling have been covered with acoustical tile to reduce inside noise level for operator comfort. A plywood and rock wool noise baffle had been constructed inside the main doorway of the power building and extends beyond the door opening on both sides of the door. The engine generator units are installed on concrete foundations which have been completely isolated from the engine room floor. All piping in the engine room has been color coded. Wherever possible, piping has been installed in trenches in the floor with steel deck plate covers.

At the beginning of a race day, both units are started and a small stabilizing load of approximately 60 kw. is put on the first generator. The second generator is then synchronized with the first and assumes approximately one-third of the total kw. load. This stabilizing load is necessary in order to keep both machines synchronized on the switchboard bus. In the event of a utility power failure, five strategically located automatic transfer switches, made by Automatic Switch Co., immediately transfer a large portion of the race track electrical load to the generator units. There

are, however, certain circuits which are transferred manually because of the nature of their operation. One of these is the escalator circuit. That portion of the race track load for automatic transfer amounts to approximately 125 kw., while the total load at the race track when all electrical connections are completed is approximately 375 kw. It was decided to use the system whereby the units are running at all times during the racing day in order to prevent even a short power interruption which would result if automatic starting, rather than automatic transfer of load, were used.

The starting is by air and two 25 cu. ft. air receivers have been installed, one of which is kept valved off at all times as a reserve air supply. The air receivers are charged by means of an air compressor which is both electric motor and gasoline engine driven. Switchboard equipment is comprised of a two-unit totally-enclosed panel with circuit breakers, field switches and discharge resistors, Allis-Chalmers rocking type regulators, synchroscope and synchronizing lights, bus ammeter and bus voltmeter, watt-meters, voltmeter selector switches, ammeter selector switches, exciter field rheostats and frequency meters with appropriate Phenolic nameplates. The two standby generators at Hialeah have many other loads in addition to the pari-mutual boards. They are prepared to supply power for lights, elevators, electric timers, escalators, water pumps and the kitchens.

Internationally famous as one of the most beautiful race tracks in the world—with its flock of flamingoes on the infield lake—Hialeah Race Course is open during the 40 peak racing days in the Miami area. The track is visited annually by a million-and-a-quarter visitors. Half of these visi-



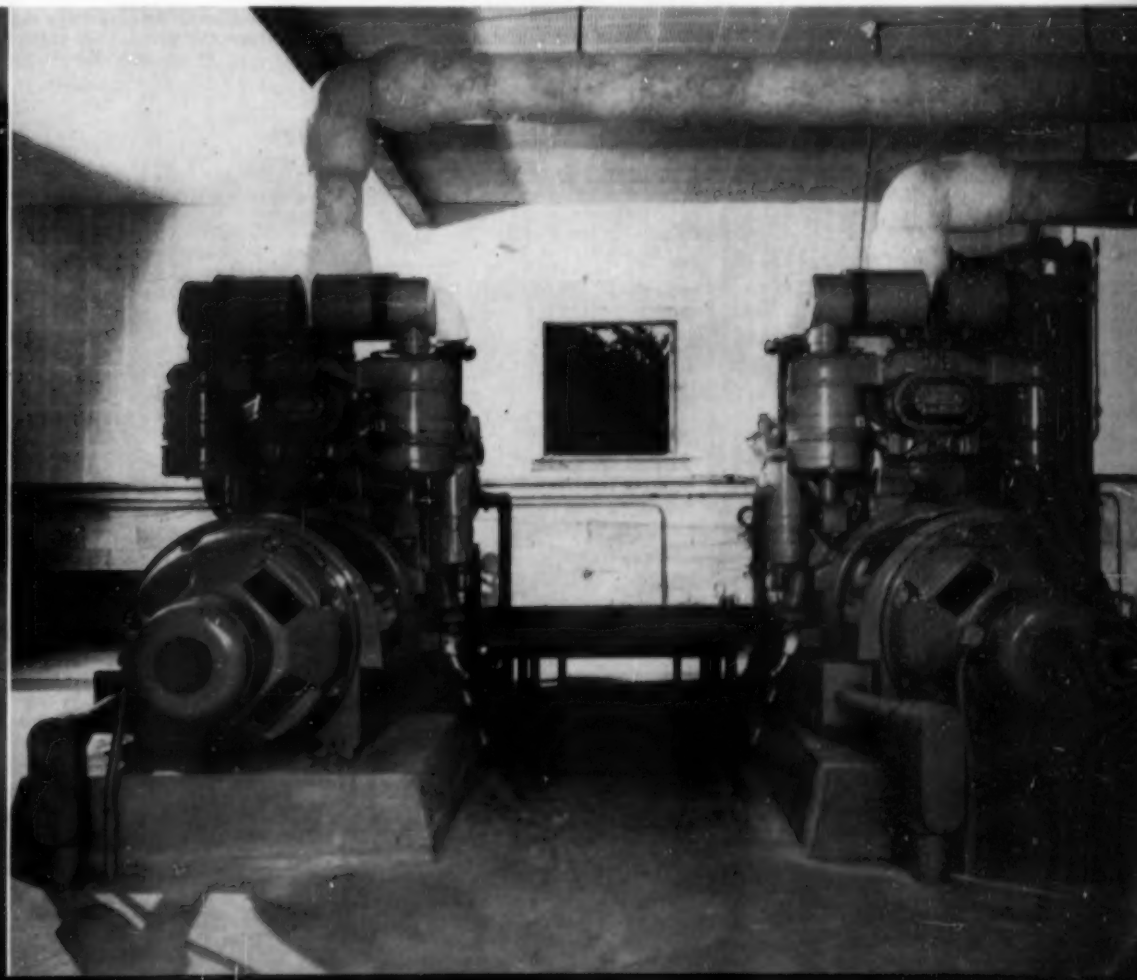
Two 25 cu. ft. air receivers assure quick, reliable diesel engine starting. Compressor is charged by either electric or gasoline motors.

tors flock there during the racing season from mid-January to early March and 625,000 others visit the exquisitely landscaped grounds during the remainder of the year when the track is open as an admission-free public park.

Opened initially the winter of 1925 at the height of the Florida land boom, Hialeah was unimportant as an attraction or as a race track until the late Joseph E. Widener took it over in 1931. An outstanding landscape artist with long experience in racing, Mr. Widener proposed to transform Hialeah into a model of completeness, comfort, and unparalleled beauty. Before putting any plans on the drafting board, however, he took his architect, Mr. Geisler, abroad to point out details he wanted reproduced in Hialeah's buildings and landscaping.

Beautiful Hialeah Race Course is assured of continuous electric power by two standby diesel generator sets.

Columbia generators with direct-connected exciters can easily carry total load of 375 kw. demanded by pari-mutual machines, calculators, automatic totalisators and other apparatus necessary to operate the track.

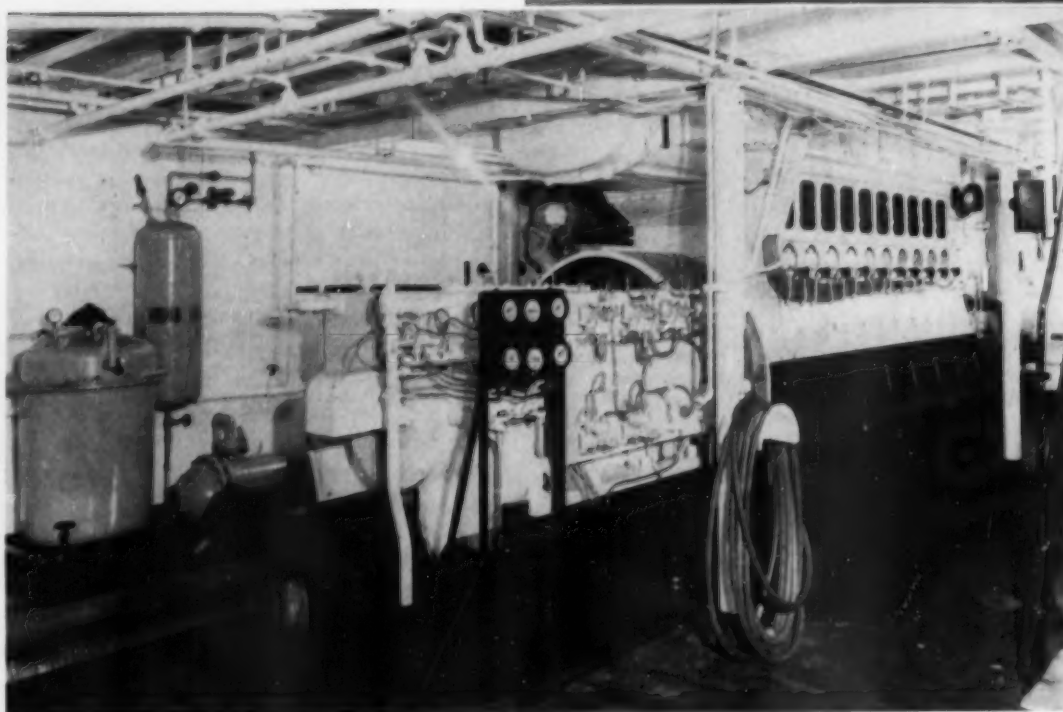


TWO POWERFUL TOWBOATS

**New Vessels Disprove River Theory
That Long Tow Requires Long Boat**

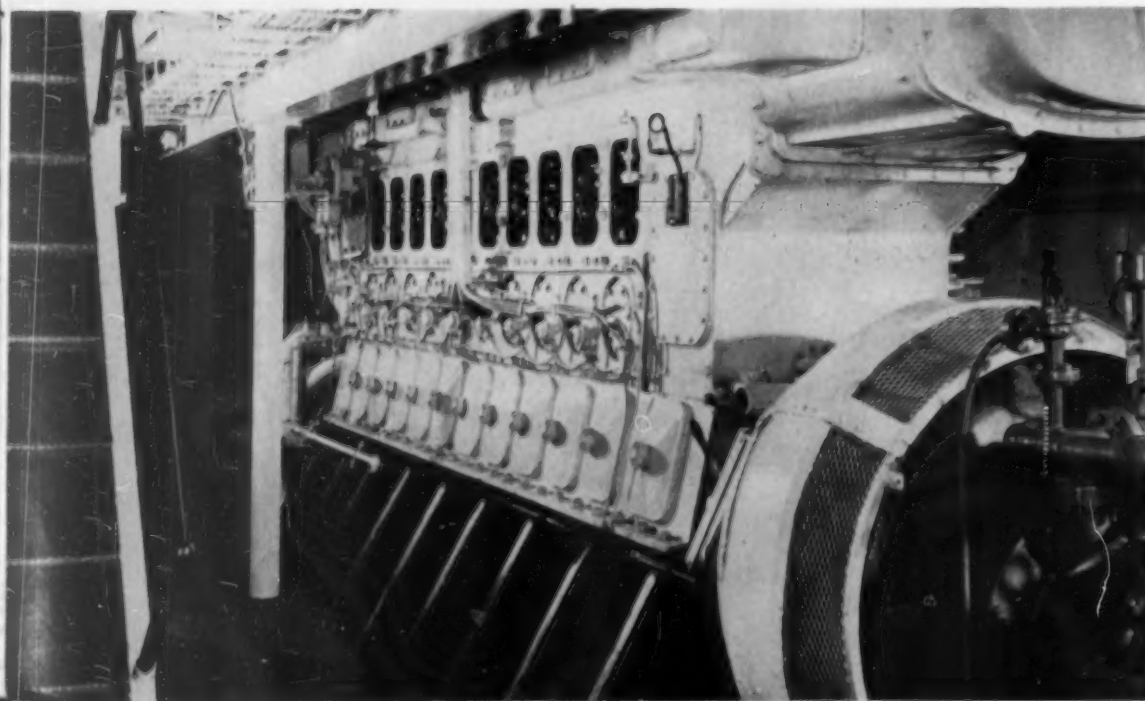
BUILT at the Alexander Shipyard in New Orleans, La., the 3200-hp. towboats *Harriet Ann* and *Frances Anne* are currently disproving an old river theory that it takes a long boat (150 ft. or longer) to push a long tow. Only 116½ ft. in over-all length, each of these powerful new vessels is driven by twin 160 hp. Fairbanks-Morse opposed-piston marine diesel engines and can handle tows as great as 18,700 tons. The *Harriet Ann* logged a total of 1788 hours and 20 minutes in active running time during the first three months of 1954. This means that in every 24-hour period she was actually moving payload cargo at capacity speeds for almost 20 hours, an average of 82.78% of the total elapsed time. In contrast to this she spent only 4.0% of the time in locking, 5.46% in picking up and dropping off barges, and 1.58% in making repairs. Throughout this period the powerful new towboat averaged a low 0.34 lb. of fuel per horsepower hour, well below the engine manufacturer's guaranty.

The *Harriet Ann* and the *Frances Anne*, with their powerful Fairbanks-Morse O-P engines, regularly handle tows in excess of the 12,000 tons for which they were designed. The *Harriet Ann*, for instance, recently completed a tow of petroleum which registered 15,000 tons, or more than 4,000,000 gallons. To haul this same amount of oil by railroad would require four separate trains, each with a full load of 100 or



A view of the *Harriet Ann*'s spacious engine room showing her port engine, a 10-cylinder, Fairbanks-Morse O-P diesel. Both engines can be controlled from the pilothouse by a set of air-operated Westinghouse Air Brake remote controls.

Looking forward in the *Frances Anne*'s engine room. The Model 38D8½, 1600 hp. Fairbanks-Morse O-P engine drives her propellers through a set of Universal reversing gears.



125 tank cars. Both craft operate over the entire inland waterway system, including the Mississippi, Ohio and Illinois rivers and the Gulf Intracoastal Canal. They tow mixed cargoes of dry bulk commodities, petroleum and chemicals.

The two model 38D8½ Fairbanks-Morse opposed-piston marine diesel engines powering each vessel are rated at 1600 hp. apiece, each having 10 cylinders of 8½-in. bore and 10-in. stroke and operating at a speed of 720 rpm. They are direct-connected through 2.50:1 reverse-reduction gears to twin, 4-bladed, 80-in. by 60-in. propellers, driving them at a shaft speed of 288 rpm. Fuel oil sufficient for more than a month's operation, is drawn from 90,000-gallon storage tanks and is sent to two 2000-gallon day tanks in the hull of each vessel. From these day tanks, which are cross-connected to permit both engines to be run off the same tank, the oil is picked up by the individual engine supply pumps and directed to two injection nozzles in each cylinder. A walking-beam assembly, developed by Fairbanks-Morse for this purpose, plus the special design of the injection nozzles used, cuts the



The 116½-ft. M/V *Harriet Ann*, one of the two 3200 hp. towboats of new design operated by the Upper Mississippi Towing Corp. Despite her short length, her twin F-M opposed piston diesels enable her to handle tows as great as 18,700 tons.

amount of fuel consumed at idling speeds to an absolute minimum, important economically.

Because towboats range over such a great area and frequently have to refuel at widely scattered points where fuel oil may be sub-standard, only the best filtration equipment and procedure is used. On the *Harriet Ann* and *Frances Anne* the fuel oil is filtered as it passes from the storage tank to the day tanks and is filtered again when the overflow from the day tanks returns to the storage tank and is forced through the filter once more. This is a continuous process, providing adequate protection for the engines. However, because fuel oils with a high sulphur content are sometimes encountered, additives must be used in the lube in addition to the fuel filtration procedure. Each vessel carries a total of 1500 gallons of lube oil in storage, metering it out to the two Fairbanks-Morse main propulsion units as well as to the auxiliary engines to prevent contamination. It is continuously filtered through a cellulose-packed, cartridge-type full-flow filter and a centrifuge and is sent to all cylinders, pins and bearing surfaces on the two O-Ps by means of a positive-displacement, gear-type pump driven off the lower crankshaft. To check the effectiveness of this filtration system, samples are taken every 240 hours and sent to a laboratory for analysis. These tests have revealed the lube to be in excellent condition at all times, there never having been a bearing failure or engine shutdown due to poor lubrication.

Aluminum bearings are used on the two O-Ps instead of bronze for this installation, and the oil sumps are wet instead of dry. A shell-and-tube oil cooler is installed for each unit as well as for the reversing gears and air compressors. Jacket water is cooled in a skin-cooling system installed on the port and starboard sides of each vessel. No raw water is used and three separate closed systems serve the O-Ps, the auxiliary generators and such other auxiliaries as the two air compressors and the reversing gears. Scav-

enging air for the O-Ps is drawn through two oil-bath filters mounted on the Texas deck, out-board. Exhaust gases are expelled through two streamlined stacks, bearing the insignia of the Upper Mississippi Towing Corp. Electric power for ship's service and the auxiliaries is supplied by three diesel-generators, each equipped with a 100 kw. alternator and exciter, and by a 25 kw., dc. generator mounted in tandem. The switchboard has a current-breaker system and no fuses. Compressed air for engine-starting and other purposes is furnished by two 2-stage, 600 psi., 7½ hp., 1700 rpm. air compressors, being stored in two 600-lb. bottles. Three different pressure systems are used: 250 psi. for the Fairbanks-Morse engines; 120 psi. for the clutch, and 80 psi. for the air-operated steering control and pilothouse control systems.

The twin 1600 hp. Fairbanks-Morse O-P engines on the *Harriet Ann* can be operated from the pilothouse by a set of air-operated remote controls, conveniently located, and on the *Frances Anne* by standard pilothouse to engine room telegraph. The 3200 hp. produced by each set of Fairbanks-Morse opposed-piston marine diesel engines ranks these modern river towboats among the most powerful and versatile on the entire inland waterways system. Their length of 116½ ft. and their great pushing capacity and speed combine to give them all the advantages of the longer boats with none of the longer boats' disadvantages. Their low rate of 0.34 lb. of fuel consumed per hp. is but one advantage.

The Upper Mississippi Towing Corp. has been in operation since 1937 and in addition to the *Harriet Ann* and *Frances Anne* has a fleet of covered and open barges and petroleum barges on the rivers at the present time. Henry M. Baskerville, Sr., is president of the Upper Mississippi Towing Corp., Walter G. Baskerville is secretary-treasurer, E. C. Rippie is vice president and

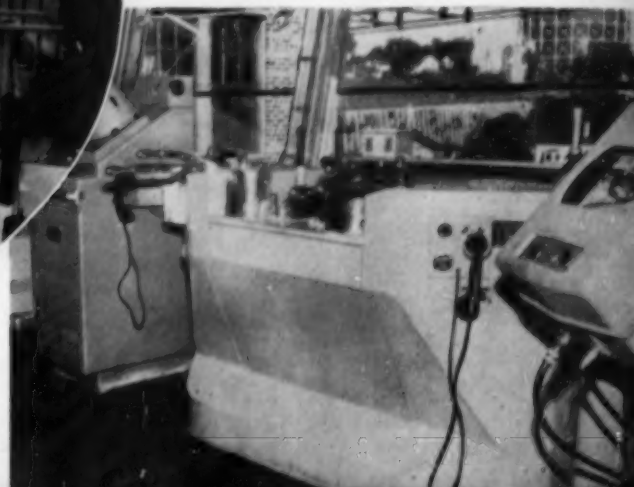
general manager, Gale Chapman is vice president in charge of operations, and Stephen Tell is operations manager. Captain of the *Harriet Ann* is Carl Warren. Captain of the *Frances Anne* is Jeff Trosclair. Designer is Del Breit, chief engineer and naval architect at the Alexander Shipyard, Inc. William Padel (deceased), also of the Alexander yards, designed the *Frances Anne*.

List of Equipment

Main propulsion engines—Two model 38D8½, 1600 hp., 720 rpm., 10-cylinder, 8½ in. bore and 10 in. stroke, opposed-piston marine diesel engines. Fairbanks-Morse.
Reverse-reduction gears (*Harriet Ann*)—Falk.
Reverse-reduction gears (*Frances Anne*)—Universal Gear.
Auxiliary generators—GM Detroit Diesel Engine Division.
Fuel oil filters—Honan-Crane.
Fuel injection nozzles—Ex-Cell-O.
Full-flow lube filters—Briggs.
Lube oil centrifuge—Sharples.
Lube oil coolers—Kewanee-Ross.
Scavenging air filter—Air-Maze.
Air compressors—Worthington.
Pilothouse engine controls—Westinghouse Air Brake.
Radar—Radiomarine Corp. of America.
Radiotelephone—Radiomarine Corp. of America.
Depthometer—Bendix.
Steering control—Westinghouse Air Brake.
Air horns—Kahlenberg Bros. Co.
Propellers—Coolidge.
Lube oil—Husky, Western Oil & Fuel.
Fuel oil—Western Oil & Fuel.
Builders—Alexander Shipyard, Inc.



Left: Captain Carl Warren is shown at the *Harriet Ann*'s pilothouse controls. Below: another view of the *Harriet Ann*'s pilothouse console. Among the modern navigation equipment installed are RCA radar, radiotelephone, Bendix depthometer and Westinghouse Air Brake steering and remote engine controls.



"TOUGHEST rock imaginable . . ." "Rough on crushers . . ." "We'd have been licked without dieselization . . ." All this from John Daley, who calls Ontario, Calif., home, yet has for nearly 14 months bossed Morrison-Knudsen Co.'s \$750,000 crushing plant along the recently completed Orinoco Mining Co. railroad, in eastern Venezuela.

The line, 91 miles long and cut through grassy flat lands and jungles in the state of Bolivar, runs from Orinoco's fabulous "iron mountain," Cerro Bolivar, to the new Orinoco river town of Puerto Ordaz. From there, ore will be loaded onto ocean-going vessels, carried 170 miles downstream to the Caribbean and shipped to U. S. Steel's Fairless Works (on the east coast) and to the Birmingham district. Orinoco Mining Co. is a U. S. Steel subsidiary whose geologists discovered Cerro Bolivar in April, 1947. An iron cap, 4 miles long, 4000 ft. wide and averaging 230 ft. deep, overlays Cerro Bolivar's 2500-ft. summit. The cap contains an estimated half-billion tons of high grade ore (about 60% iron), making it one of the world's richest ore bodies.

In early January first ore shipments began. Orinoco's operation is geared for 5,000,000 tons annually, most destined for U. S. furnaces. Morrison-Knudsen's job was to lay and ballast 91 miles of standard gauge trackage. And this meant lots of ballast. Thus the \$750,000 plant (designed by Milwaukee's Smith Engineering Works), completely dieselized, with capacity to crush 250 tons of extremely hard granite an hour. In all, some 600,000 tons were needed for ballast. All of it came from the single quarry-crusher combine. The plant consisted of a 48-by 60-in. Kennedy Blake jaw crusher, handling 250 tons an hour. From the primary, rock crushed to about 6-8-in. diameter, was conveyor-piled via a diesel-electric powered, rubberized belt traveling 300-350 ft. a minute. This conveyor, from primary crusher to surge pile, was

36 in. wide, 127 ft. 6 in. long. From the bottom of the surge pile, a secondary conveyor, traveling at the same speed, lifted rock into the first of four secondary crushers.

Secondaries were paired. There were two Tel-smith breakers and two Tel-smith gyrasphere crushers, each powered by its own diesel engine: two D-13000s (at 1000 rpm.) drove the breakers; D-17000s (at 1000 rpm.) powered secondary crushers. A D-375 operated the primary. Finished, screened products: (1) 1½-2 in. diameter ballast; (2) ¾th and "fines" for road surfacing; (3) rescreened fines for concrete block aggregate. Concrete-block construction predominates the homes at Orinoco's Puerto Ordaz. The secondary crushers' lowest functional part was approximately 10 ft. above the natural seepage area in which the plant was built. Steel-framing elevated the crusher, while concrete piers, one for each engine, were laid under the diesels. The entire plant was thus out of reach of seepage, or water from sudden torrential rains. The primary's Caterpillar 375 was boosted approximately 46 hp. by supercharging and putting its radiator fan on a 20 hp. motor, rather than use directly coupled diesel engine power to drive it. Actually this horsepower increase was the by-product of necessity.

Since the engine was located about 30 ft. down in a cut—dozed from a hillside—the radiator would not have gotten sufficient air had it remained an integral part of the diesel plant. So it was removed, mounted atop the cut and rigged to the electric motor. Likewise, the supercharger's air-filtered intakes (Moline) were also mounted above the cut and their piping extended some 30 to 40 ft. This added power was put to good use, since the primary crusher found it hard going, crushing the heavy and almost seamless granite-quartzite.

But crusher engines were only one part of the

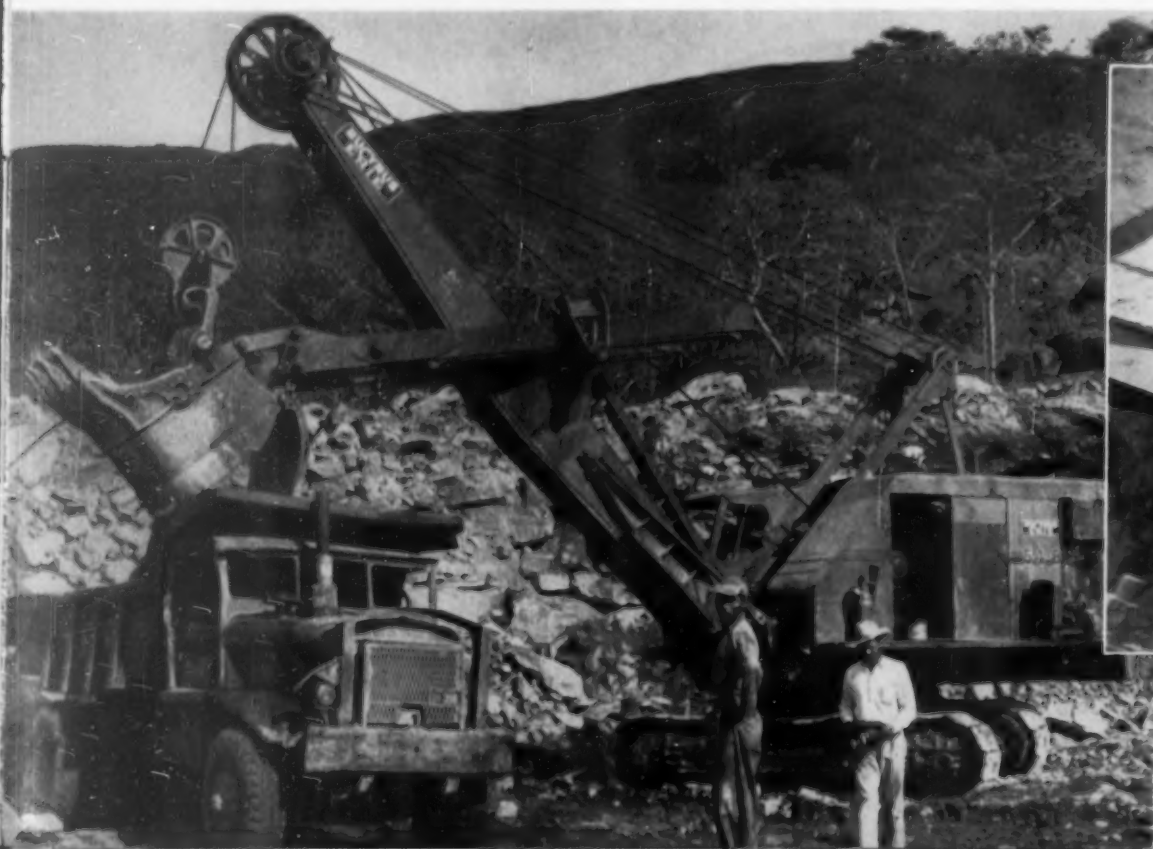


Secondary of the crusher, showing engine positions and the conveyor system.

ORINOCO MINING

By JAMES JOSEPH

Bucyrus Erie shovel (diesel) loading a Euclid diesel truck.





**\$750,000 Dieselized
Plant Crushes Railroad
Ballast for Venezuela's
Orinoco Mining Co.**

D-375 operating crusher's primary
was housed in this low area, its radiator
and superchargers mounted atop
cut.

plant's dieselization. All conveyors (Barbara-Greene systems) were driven by electric motors, power supplied by a D-17000. Its radiator was also mounted atop the hill to take advantage of cooler air. In the plant's small power house (mainly furnishing electricity for lighting) were a Caterpillar diesel-electric set (D-397) and a smaller D-364 standby. A D-318 furnished auxiliary night lighting when the plant was closed down. Output of the diesel electric plant was synchronized from a central panel (United Electric Co. and Esco switch gear), at 440 volts, 60 cycles. A total 54 men worked three 8-hour shifts (17-18 to a shift) for a period of some 14 months. At least 25 9.8 cu. yd. dieselized dump trucks worked the project continuously. Twelve were end-dump Euclids. Engines were General Motors and Cummins. Superintendent Daley reported that during some 8-hour shifts as many as 175 truckloads shuttled the 1¼ miles between quarry and primary crusher. Rock came from the face of a nearly seamless mass of granite and quartzite close-by the crusher. Despite use of two "coyote" holes and their teed tunnels driven into the mass' face, despite detonation of about 1½ lbs. of dynamite per yard, the rock still "broke big." As Daley said, "For all practical purposes there were no seams—not even a healed seam." Rock, however, did lay in horizontal layers and there were weak stratas.

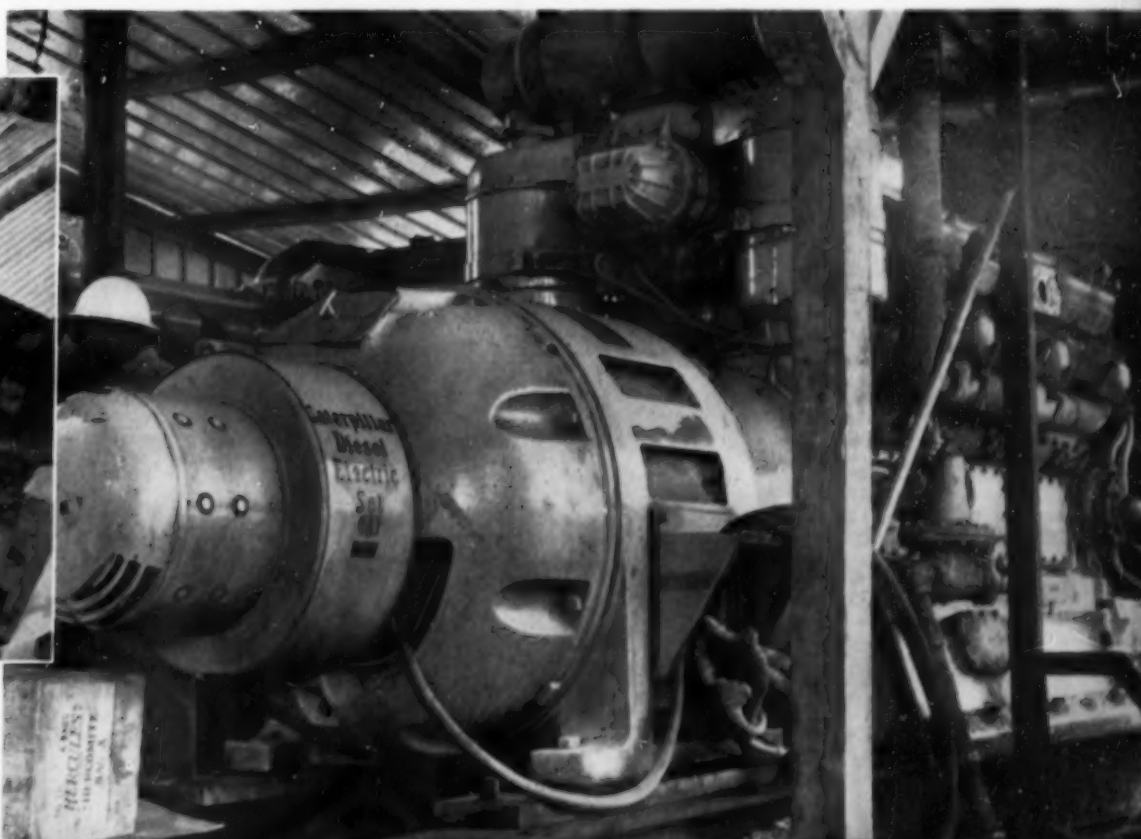
Working the quarry were six portable Ingersoll-Rand No. 600 compressors powered by GM 6-71 diesels. Two Bucyrus-Erie 2½-yd. dieselized shovels tended blast clean-up and loaded the shuttling 9.8 cu. yd. trucks. In practice, there were two blasts daily: one at 6 a.m., the other at 3 p.m. On an average, Ingersoll-Rand compressors powered wagon drills which burrowed some 350 holes per shot. For the early morning blasting, about 700 lbs. of dynamite were used; about 800 lbs. for daytime detonation, a total

of 1500 lbs. every 24 hours. A single, 1500-gallon diesel tank was mounted on the hill above the plant, gravity feeding the engines some 30 ft. below. Diesel fuel (about 15 cents a gallon) was trucked the 60 kilometers north from Ciudad Bolivar, main port city on the Orinoco.

Orinoco's 1600-hp., 185-ton Baldwin-Lima-Hamilton diesel-electric locomotives regularly hauled as many as 48 50-ton ballast cars to the crushing plant's stockpiles (each with a capacity 83,500 cu. yds.—100,000 tons). Upwards to eight ballast cars an hour could be filled. Typical storage pile was loaded out from its bottom-center, via a 30-in. Armco steel tunnel running 290 ft. to the rail siding. In this tunnel was a conveyor, capable of loading 400 tons per hour. The stockpile was fed via a 300 tons per hour inclined belt, 30 in. wide and 320 ft. long, emanating from the secondary crusher. Fines, screened out at the crusher, were train hauled either to Orinoco's Puerto Ordaz aggregate plant or trucked to various nearby road-surfacing jobs. Despite the region's high humidity (averaging 50% dry season, 80% wet), diesel engines showed little wear or corrosion. The Euclids, the project's work horses, were seldom down.

All told, Morrison-Knudsen threw more than 400 pieces of rolling equipment worth an estimated \$6,000,000 into the railroad-highway project. Included were: 5 Macks with NBH Cummins engines; 2 Mack tractors with the same engine; sixty-four #82, #80 and #49 dieselized Euclids (up to 18 yds.); more than 51 Rotary diesel compressors; 21 shovels and cranes, mostly dieselized; 6 Koehring WD-60 dumpsters with GMC 471 engines; 20 diesel-generator sets, GMC and Caterpillar; some 70 diesel tractors, among them 31 D-8s. Also on the job were 8 Wooldridge scrapers and 7 Terra Cobras with tractors.

In crusher power house, this Caterpillar diesel electric set, D-397, and smaller D-318 generator sets furnished electric power.

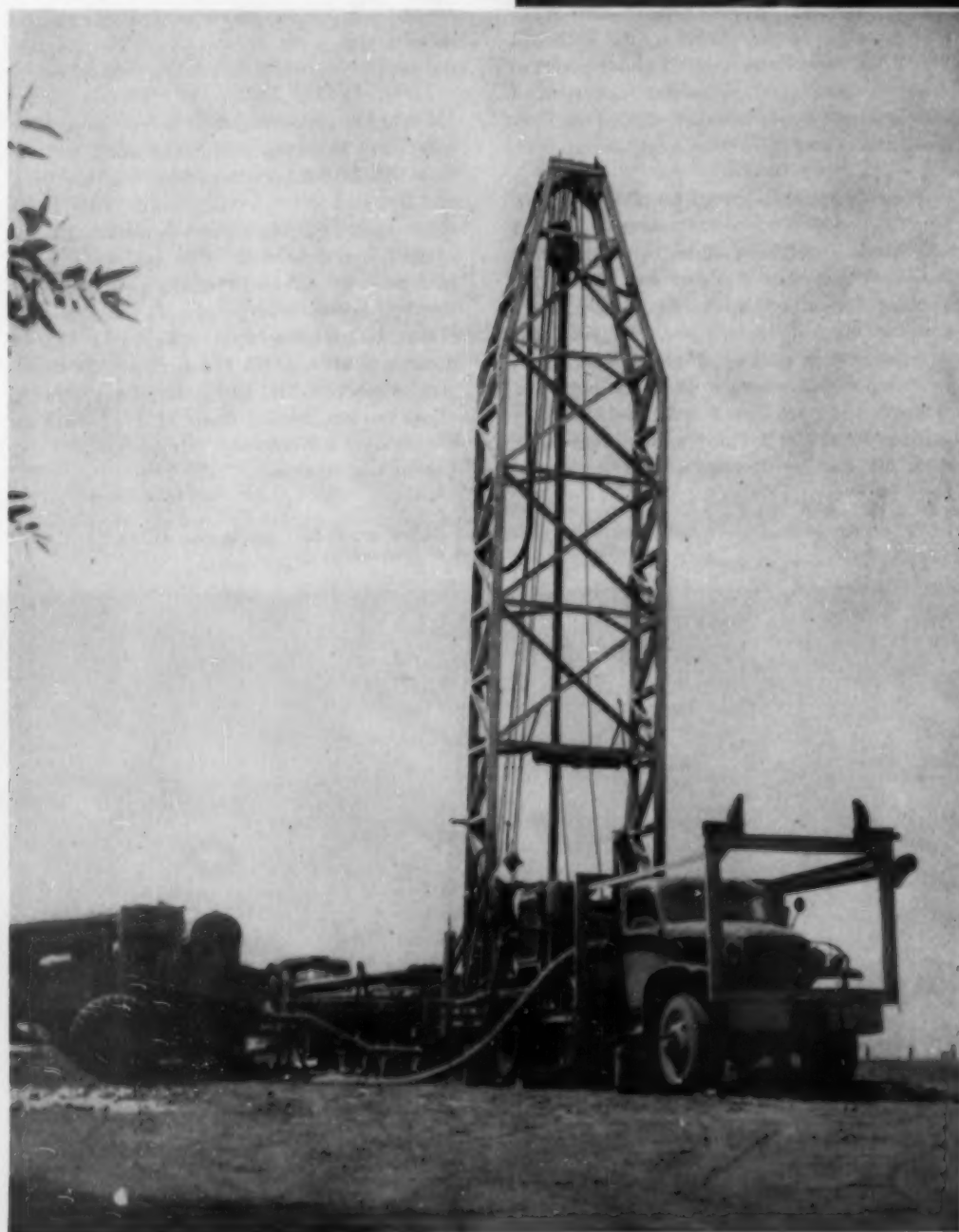


DIGGING DIESELS

By F. HAL HIGGINS

Eaton rig No. 2 receives shop service. Mounted on an Autocar truck, the rig has both Cummins and GM diesel engines. One Cummins powers the truck and operates the Gardner-
Denver; the GM 6-71 operates drill and rotary table.

GM 6-71 diesel engine does a triple-duty job on a well-drilling rig for Eaton & Sons, Woodland (Calif.) pump and well sales-service firm.



WATER is the No. 1 essential to growth and prosperity in the West. It is as true for industry and home population as for agriculture. The problem of obtaining and efficiently using enough water to keep pace with western development grows from year to year, and most people are apt to overlook the fact that there are still many wells being drilled and re-drilled to greater depths to meet the demand for water. At Woodland, in California's Sacramento Valley, a well-drilling family of a father and his four sons have built themselves a substantial business by learning well drilling from the ground surface down to the water—and all the way back again.

We met Marshall Eaton, one of the sons, at their No. 3 rig working on an irrigation well at a farm east of town. The rig was mounted on a 6 by 6 3-axle truck and powered by a GM model 6-71 diesel engine. "I'm the farmer of the Eaton family's well-drilling and farming enterprise," he explained. "We didn't begin handling a line of pumps until three years ago—the U. S. line built in Los Angeles. It combines good engineering and is as good as or better than competitive pumps already represented in this area, which does an annual pump and well-drilling business of nearly a million dollars." Peerless, U. S. and Johnson are the chief pumps represented in this area which covers Solano and Yolo counties and half of Colusa county, on the west side of the Sacramento Valley.

The Eatons are typical western engineers, in that they add their own ideas to gain efficiency, cut costs and speed up the job. The diesel on



ranches and Union doing a similar job at Heidricks ranches scattered over 20,000 acres. Some ranches were investing as much as \$3500 a month in petroleum products from local service distributors. One probably topped \$5000.

We moved from the No. 3 rig back to the shop to meet F. H. Eaton, head of the family business, and to see the No. 2 rig, in the shop for overhauling. No. 2 rig is mounted on an old Autocar truck, which has been changed over to a Cummins 4-cylinder diesel engine to power the Gardner-Denver compressor. Also on this rig is a GM 6-71 diesel to operate the drill and rotary table. The unit's derrick is 50 ft. of 4-in. pipe. A trailer behind the truck carries pipe.

The Eatons' No. 1 rig is also a change-over to diesels. It was built by F. H. Eaton in 1928, over a quarter of a century ago, as a simple wooden derrick, 28 ft. high, but has been changed to a 38-ft. derrick. To modernize it, a pair of Cummins diesels were installed, one to

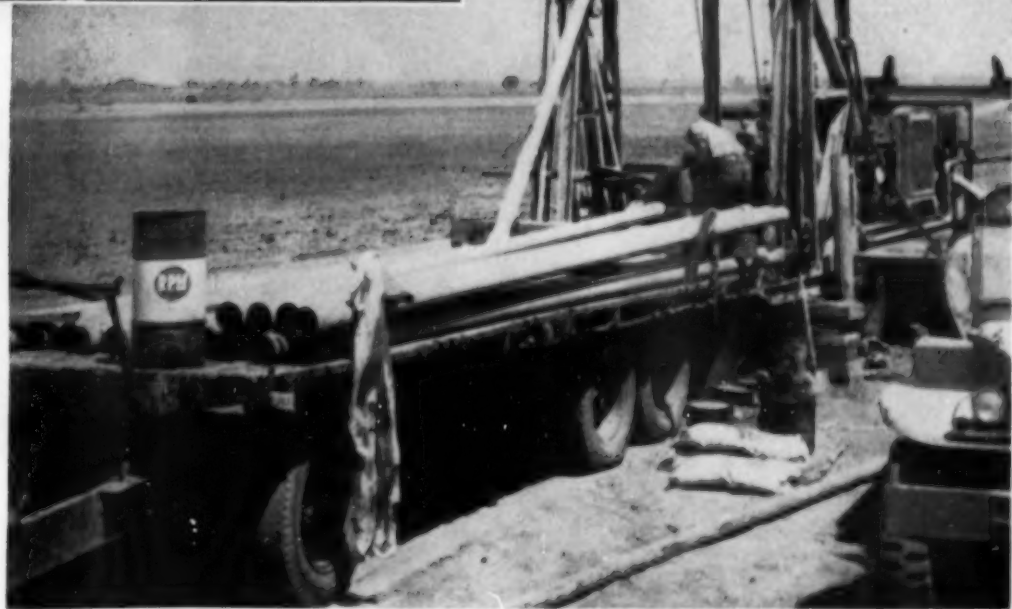
run the drill and the other to power the pump. The No. 4 rig is on a Ford truck with a GM diesel engine. This unit is used on test holes, domestic wells and similar small jobs.

"I started with cattle and general farming in the San Joaquin Valley when my boys were in diapers," F. H. Eaton recalls. "When we came here to Woodland we had one poor old well-drilling rig that I operated myself. We now have four rigs with an investment of \$100,000 in diesel equipment. It takes a 16-man crew to operate this squad of rigs. My son Edmund manages the rigs and Marshall manages the farming side of the business—750 acres in rice, sudan grass and pasture. I do the collecting, rustle up the jobs to keep us all busy. We overlap a lot on these jobs, however. We added pumps several years ago, so we now sell, service and drill the wells.

"A lot of changes have been coming into the well-drilling business with expansion of farming, demands for farm crops and development of more irrigation water and its diversion to new areas. Where we drilled wells 250 ft. on the average about 15 years ago, they now go 600 ft. Cost runs \$60 to \$80 an acre for wells on farms in this area; it used to be \$20 to \$25. But farmers understand costs and grumble less about prices of drilling today than they did in the old days. The business is on a sound and healthy basis," Mr. Eaton concludes.

Note pipe-carrying trailer arrangement on this Eaton rig at work in Yolo county. It is easy to see why grease and lubes are important in this farming empire, where ranchers are served by Standard of California, General Petroleum, Union, Shell, Texaco and Richfield distributors.

GM 6-71 powers Eaton rig No. 3, shown working on a ranch east of Woodland. RPM multi-service gear lubricant is handy for use. Other Standard of California products were noted around the outfit.



their No. 3 rig drives the draw works and the rotary table with its 40 ft. of 4½-in. pipe. Also powered by this engine is a Gardner-Denver mud pump. The Eaton touch in this rig is a mud conditioning unit which stays submerged, picks up tailings to put clean mud in the tank.

Noting a drum of RPM multi-service gear lubricant and other Standard of California cans and drums of that brand, we remarked on the efficient service the oil industry has developed in the Sacramento Valley where Union, Associated, Shell, General Petroleum and Richfield trucks deliver their products to keep the most highly mechanized farms in the world rolling at top efficiency. We recalled Standard's Woodland manager servicing the King





Designed for the inland waterways sand trade, this new 74-ft. boat is powered by twin 300-hp. Atlas diesels.

Boat was named after Capt. W. T. Stump, shown with Mrs. Stump who christened the "pride of Parkersburg."

SALUTING THE CAP'N BILL STUMP

By DAVID I. DAY

NOW at work for her owners, the Kanawha Sand Co. of Parkersburg, W. Va., is the trim *Cap'n Bill Stump*, newest of the towboats built by Hillman Barge & Construction Co., Brownsville, Pa. The boat was named for Capt. William T. Stump, for 55 years a well-known figure in river boating. The recent christening of the craft was the pleasant chore of the captain's wife and was followed by a dinner honoring the Stumps.

In common with many others who watched the construction work from week to week, we felt the naming of the vessel was very appropriately done and that it was fitting the job should take place at the historic Brownsville yards. For 141 years, new boats have been coming away from this Monongahela River port. The *Cap'n Bill Stump* was built specifically for the sand trade which is a very important one on midwestern rivers. It is believed it will prove to be the first of a type that will be of vast benefit in all sorts of river work calling for

a small pusher. This vessel combines neat appearance, economical operation, a high degree of livability and an unusual amount of maneuverability.

The new boat measures 74 ft. in length, 20 ft. in beam and 8 ft. in depth, calculated to operate on 6 ft. of channel water. The hull is of all-welded steel with a 5/16 in. bottom plating, 3/8 in. plating on sides and stern, the same hull thickness on the tunnels. The skin coolers for the main and auxiliary engine jacket water are welded tightly to a protected portion of the bilge. The boat has plenty of fuel storage capacity for 12-day operation. A 3000-gallon tank provides all the water needed for all boat purposes. This is likely to prove more satisfactory on future boats under 100-ft. length than the more conventional method of separate sources for the various water needs.

The steel superstructure is completely insulated and lined with tempered Masonite except in the

engine room where asbestos acoustic panels are employed. Complete quarters for six persons are provided and there is space to accommodate a larger number if necessary. The quarters are well and neatly furnished and it is believed that no towboat in the upper Ohio, Monongahela, or the Kanawha offers more convenience and solid comfort to the men aboard. This same principal of providing lots of real hominess to employees extends to the galley and messroom, just aft of the main cabin.

One of the attractive parts of the boat is its commodious pilot house, with plenty of comfort and visibility. The control of main engines and rudders is from the pilot house and the steering system is one of the most efficient to be found on the inland waterways. This steering system is composed of two independent hydraulic systems, each with its own motor-driven pump, oil sump, 4-way control valve and hydraulic cylinder. Though operated separately under normal conditions, they may be easily inter-



connected and operated from either pump. We can say this for the mechanical control system: it positively positions the rudders. There is never any occasion for guessing about that.

While the pilot house, the cabins, the galley and messroom, and all other parts of the *Cap'n Bill Stump* appeal to the eye, particularly the eye sharpened by river boating experience, we believe the engine room has made the deepest impression. It is large enough for all practical purpose and is well lighted and well ventilated. Propulsion power is provided by twin 300 hp., model 35-S2X-6 turbocharged Atlas diesel engines from the National Supply Co., Springfield, Ohio. At the ceremony from National Supply, were Robert M. Pearson, manager of inland marine sales; Harry F. Clark of the advertising department; Dick McCloskey, sales engineer; and Robert M. Sullivan of the sales department. The main engines generate a total of 580 hp. at 1200 rpm. They are equipped with air starting and Snow-Nabstedt reverse and reduction gears. The auxiliary power is provided by two 20 kw., 110-208 volt ac. Delco generators, driven by General Motors model 2-71 diesel engines. These generators can be synchronized to carry unusually high electrical loads. (A sheave on the front end of the Atlas engine powers a hydraulic pump for the rudder system, and a small bilge pump, thus

the 290 bhp. rating for each at the propeller.)

Friends of Kanawha Sand Co. are delighted that the acquisition of the new towboat marks a step forward for it in the sand trade and in river estimation generally. We have seen, during the last year or so, all three of the present fleet. The pick is the comparatively new *Mountaineer*, 400 hp., with a pair of Cummins diesel engines. The *Trojan* with twin General Motors engines is rated at around 270 hp. And, some time ago, we noted the *Marguerite* with a 100-hp. Fairbanks-Morse engine, the oldest of the boats operated by the sand company. Naturally, the new 580-hp. vessel is making a good impression in the area served by the Parkersburg concern, a very nice advertisement for the Hillman yards. Since the boat was launched, we have had six or seven letters from news sources mentioning the pusher. One correspondent referred to the *Cap'n Bill Stump* as "the pride of Parkersburg." Present at the christening of the boat were Mr. and Mrs. James Wakley of Parkersburg. He is the manager of the company and widely known along the upper Ohio and tributaries. Miss Madeline Collins, secretary of the owning company, was also on hand for the christening, as were Capt. and Mrs. R. F. Eberhardt, Capt. and Mrs. R. J. Hiernaux, Capt. and Mrs. Stump, Capt. H. A. Carpenter, Mr. and Mrs. A. V. Criss, Mr. and Mrs. William

Greenwood, Luther T. Peters, Reid S. Byers of the Hillman yards and Capt. and Mrs. Fred Way.

The *Cap'n Bill Stump* will certainly be a comfortable boat in winter and summer. This is something of an achievement in a valley that usually has hot and humid summers and winters with all sorts of variations. The boat's heating system is oil fired, using a hot air furnace for uniform distribution of warmth. A special ventilating system was installed which gives continuous air circulation in hot weather. The deck machinery consists of the usual fittings plus a couple of Patwisco barge winches. We salute the boat as one of the best we've seen to her inches anywhere—a useful towboat with every needed refinement.

List of Equipment

Engines—Twin model 35-S2X-6, 300 hp. Atlas diesels, National Supply Co.
Auxiliary engines—2 General Motor's 2-71 diesels, Detroit Diesel.
Generators—2 20 kw., 110-208 volt, ac., Delco.
Turbocharger—Brown Boveri.
Oil filters—Winslow.
Reverse-reduction gear—Snow-Nabstedt.
Pilot house air controls—Westinghouse Air Brake.
Exhaust silencers—Maxim.

In this spacious engine room, twin Atlas turbocharged diesels deliver 580 hp. at 1200 rpm. through Snow-Nabstedt gears. They are equipped with Winslow oil filters. Two model 2-71 GM diesels furnish auxiliary power.





M/V *Balfour* is a new ferry put into service by British Columbia Public Works Dept. Two Harbormasters, powered by Caterpillar diesels, propel and steer boat.

CANADIAN FERRIES USE HARBORMASTERS

Single heavy-duty outboard power unit swings 50x32 in. wheel on 64-ft. *Catherine Graham*. Note off-center location. GM 4-71 Detroit Diesel furnishes power.



Two Harbormaster dieselized ferries were placed in service during 1954 by the Public Works Dept. of the Province of British Columbia. The largest of these, the M/V *Balfour*, was designed and built for service on Kootenay lake. The 6-mile crossing is a link in the Southern Trans-Provincial highway. The smaller vessel, the *Catherine Graham*, has a run of 1.4 miles in the Denman Island-Buckley Bay service.

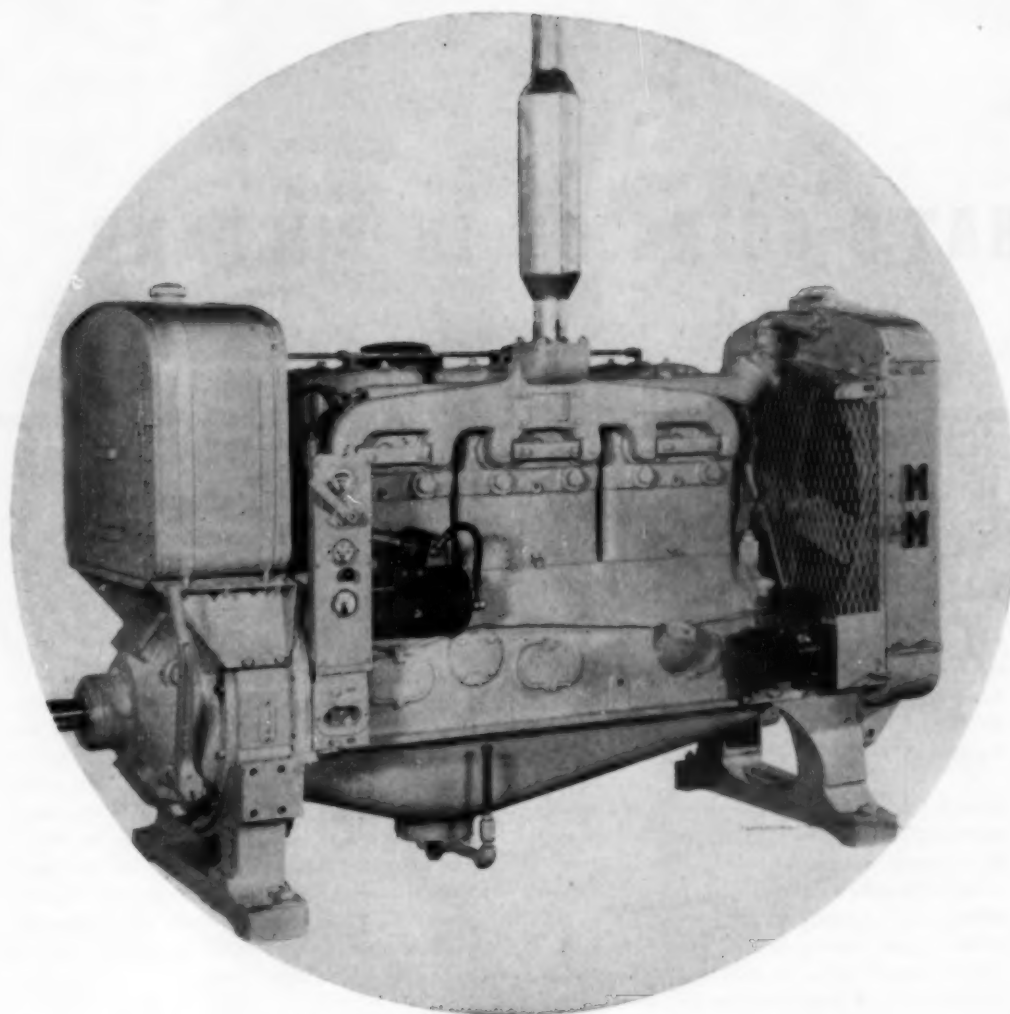
Inclusion in the design of the two ferryboats of Murray & Tregurtha Harbormaster units is a new application of the heavy-duty outboards. The propellers provide thrust-steering and give the boats exceptional maneuverability and ease in handling.

T. A. McLaren designed the *Balfour*. She was built on Vancouver Island by Yarrows, Ltd., of Esquimalt. Her length is 181 ft., beam, 48 ft., speed, 9.4 mph. Capacity is 40 autos and 135 passengers. Working in conjunction with the M/V *Anscomb*, launched in 1946, 1280 cars a day can be transported across the lake. Entry into service of the second ferry alleviated the long waits and traffic jams previously experienced. The Hon. Philip A. Gaglardi, Minister of Public Works for the province, commissioned the *Balfour* June 19, 1954.

Two Caterpillar D337 diesel engines power the two Model O-62C Harbormasters. Each unit is rated at 170 hp. at an engine speed of 1600 rpm. The propellers are 60x46 in. and turn at 274 rpm. Engines and power units are operated from the pilot house by hydraulic controls.

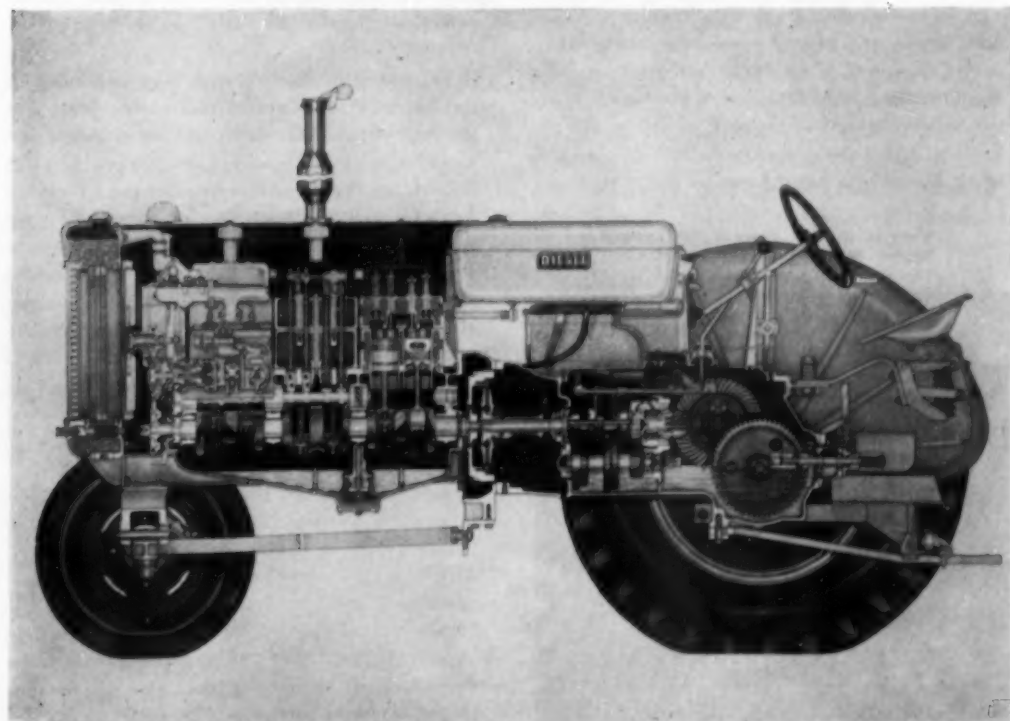
The *Catherine Graham*, launched in April, 1954, also was designed by T. A. McLaren, Vancouver. S. Madill, Ltd., Nanaimo, B.C., built the all-steel ferry whose capacity is seven cars and 35 passengers. The ferry's length is 65 ft., beam, 30 ft., and draft, 5 ft. The Model OA31 Harbormaster is powered by a GM 4-71 Detroit Diesel and swings a 50x32 in. wheel at 352 rpm. The Harbormaster is located off-center to allow ample room for cars and trucks to run on and off the boat.

M-M OFFERS NEW ENGINE



New Minneapolis-Moline 72 hp. diesel power unit equipped for industrial applications. Six-cylinder engine has 425.5 piston displacement.

Cross-section view of D425-6 engine and power train in M-M Model GB tractor. Double-disc clutch is used to overcome heavy loads.



The Minneapolis-Moline Company announces a 6-cylinder diesel engine of 425.5 cu. in. displacement which offers large wheel tractor owners and industrial engine customers a complete selection of fuels. The new engine utilizes a $4\frac{1}{4} \times 5$ in. Lanova energy cell, and will deliver up to 72 hp.

Designated the Model D425-6, Minneapolis-Moline points out that increased crankshaft and connecting rod bearing sizes will achieve effective crankshaft lubrication and minimum bearing loads. To insure an ample supply of filtered air, the new diesel has a large capacity bath air cleaner, and, for dependable operation, dual full-flow oil filters. Advantages claimed for the energy-cell design are cleaner exhaust, smoother operation, high fuel combustion efficiency, more effective piston pressures, lower pressure peaks, and lower piston temperatures. The engine is equipped with Bosch single-plunger pump, self-cleaning pintle type injection nozzles, and a 3-stage fuel filter. The latter is gravity fed through primary and secondary filters, but pressure fed through the final stage.

Standard Minneapolis-Moline engine design features that make this model a heavy-duty diesel are cylinder blocks cast in separate pairs, removable from the crankcase; extra depth of the crankcase below the center line of the shaft; heavy cast base pan; and wide, rigid flywheel housing flange. While engine parts are high production items, all units are assembled to individual order to meet customer requirements. This manufacturing method also provides for the installation of special and accessory equipment such as manifold heaters or pressure primers to assist cold weather starting. Regular features include positive crankcase ventilation and dual air cleaning.

The M-M Model D425-6 is offered as optional power for the company's Model GB tractor. Laboratory tests and field experience indicate that with this engine, the GB tractor will be among the most powerful of the wheel tractors. The GB has an improved heavy-duty differential and final drive with bronze back-up plates, one-piece forged steel shaft and pinion, and high-grade roller bearings. A double-disc clutch furnishes reserve torque capacity for starting unusually heavy loads.

Accessory equipment on the engine includes: generator and electric starter—Delco-Remy; injection equipment—American Bosch; energy cell—Lanova design; clutch—Twin Disc; fuel filter elements—Fram; air cleaners—Donaldson; crankcase breather—United Specialties.



WHAT'S GOING ON IN ENGLAND

CONDUCTED BY HAMISH FERGUSON

Hamish Ferguson received his training and early experience with the English Electric Company. Subsequently, he spent a number of years with a firm of diesel engine consultants, London, and in 1944 became secretary to the Diesel Engine Users Association. In 1953, he relinquished his appointment to devote his time to private consulting work connected with diesels and gas turbines.

PERKINS DIESEL DEVELOPMENT

The Company of F. Perkins Ltd., Peterborough, England, was founded in 1932. Starting with only a small workshop, the total of staff and employees amounted in all to only 12 persons. Today the total exceeds 5,000 with almost as many more employed on the manufacture of components in the workshops of the Company's suppliers. Production has since been doubled and now comprises over 1/2 million square feet of covered workshops on a site of 120 acres.

The original idea was to produce a small high-speed diesel engine suitable for adaption to a large variety of vehicle, industrial, agricultural and marine applications, and which would be readily interchangeable with existing petrol or kerosine engines. The first engine was a 4-cylinder

unit of 3 in. bore, and in 1937 standardization was achieved on one type of engine with the introduction of the well-known P6, 6-cylinder engine. 100,000 of these engines had been produced by September, 1952.

In addition to the main factory there is a further workshop in Peterborough devoted to research, development and reconditioning. The laboratories contain the most modern mechanical, chemical and metallurgical equipment, and new types of electronic engine testing devices of the Company's own design are in use to assist in the development of proto-types. A shop is laid out for engine reconditioning, and under an exchange agreement a fully reconditioned engine can be supplied with the same guarantee as for a new engine.

It has been the Company's policy to buy from outside suppliers the greater part of the engine components, and thus the production work at Peterborough consists mainly in machining, assembly, testing, and packing for dispatch. Machine tools of the most modern types have been installed, both British and American machines being extensively employed. Completely automatic transfer machines have been introduced, the largest being two machines which together complete all the drilling and boring operations on the cylinder head. Assembly is carried out on pallet type con-

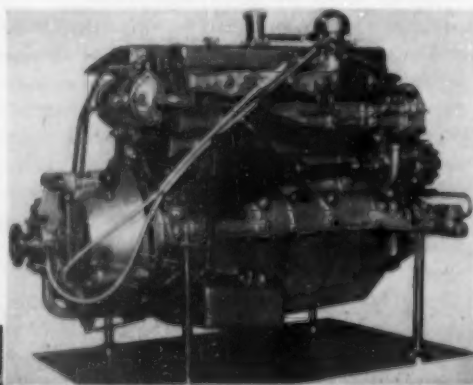
veyors. Every engine is subjected to a functional test covering performance and fuel consumption. The type of test brake used is of Perkins design. It consists of an ac. motor connected to the electric supply mains, and utilises a little known property of the ac. motor. This is that if the motor be driven mechanically at slightly above its natural running speed, it will generate current and deliver it to the mains. The amount of current generated, and the driving power absorbed, will increase smoothly as the speed is gradually raised above the natural value; full power being reached with an increase of about 5 per cent.

The original Perkins engine was the Vixen which was followed by the Fox, Wolf, and Leopard engines, all having four cylinders. As the result of experience with these engines the P6, six-cylinder engine was evolved. Its rated output is 83 bhp. at 2,400 rpm. and its specific weight is 8.6 lb. per bhp. To meet the demand for a smaller engine, the P4 and P3 have been developed having four and three cylinders respectively and the same output per cylinder as for the P6.

A substantial market has now been developed in the agricultural, industrial, and marine fields, and for these applications the limitations of weight and space are not so stringent but low cost is of primary importance. To meet this demand the L4 engine has been produced. With bore and stroke of 4 1/4 in. by 4 3/4 in. its rated output is 53 bhp. at 1,800 rpm. It is claimed that this engine is the lowest priced diesel of its class in the world today. In recent years the speed and power requirements for engines suitable for medium tonnage vehicles, particularly overseas, have increased and this has led to the development of the R6 engine which has an output of 108 bhp. at 2,700 rpm.

A subsidiary manufacturing company has been formed in Canada, and subsidiary trading companies have been set up in Canada, France, South Africa and Australia. Distributors have been appointed throughout the world. Approximately 70 per cent. of the Company's production goes for export, and to date 138 countries are on the order book. Over 100,000 Perkins diesels are now in use overseas.

A Perkins P6(M) with MR11B oil operated reverse reduction gear and direct drive. It has Berger hydraulic starting equipment rated 45/65 bhp. at 1250/2000 rpm.



View of the test shop at the Eastfield factory of the F. Perkins Ltd. Company.

Mr. Frank Perkins, chairman and managing director of F. Perkins Ltd., Peterborough.





Part being treated by "Alumicoat" process is being removed from bath in molten aluminum. Steel is penetrated—.0015 to —.002 in. with about .0005 to 0.001 in aluminum coating on the surface.

OXIDATION AND CORROSION OF METALS RESISTED

This piston, taken from a diesel with a 29-in. bore, has been coated down to ring grooves. Several of these processed pistons are back in operation.



Industrial equipment metal parts which are subject to high temperatures and the corrosion of industrial gases and chemicals may now wear longer when coated with aluminum by the new "Alumicoat" process. For the first time, industry may have the advantage of bonding aluminum or its alloys to ferrous material with the facilities of the largest equipment for the purpose known today. A new plant designed for the process was opened during October 1954.

The new process is applicable to diesel piston heads, exhaust and silencers; to equipment used in oil refining and may make possible the restoration of many diesel, turbine and other engine parts and the prevention of corrosion and oxidation.

Marking the passage of their fiftieth year in business, the Arthur Tickle Engineering Works, has erected a new plant in Brooklyn for metallurgically bonding pure aluminum and its alloys to steel and has given engine and auxiliary equipment manu-

facturers and users the economy of Alumicoat. The firm will operate under license from the General Motors Corp., using equipment designed for dipping and treatment of metal parts. This is not the same process as "Alumibond" which is the joining of aluminum and iron or steel by a molecular bond achieved by casting and which was licensed to the Arthur Tickle Engineering Works in 1950 by the Fairchild Engine and Airplane Corp.

In the Alumicoat process, the surface to be bonded is cleaned, the parts are fluxed in a salt bath and dipped in molten aluminum producing a metallurgical iron-aluminum bond at the interface with penetration of the steel and an outside thickness of aluminum that can be determined accurately. Several months after aluminum dipped parts have been returned to use, they have shown no evidence of deterioration. Several M.A.N. diesel pistons from an engine with 29 in. bore were put through the Alumicoat process down to the ring grooves and have been returned to operation. These have been tested successfully so far and may prove to be a means of preventing corrosion and uneven deterioration of diesel engine pistons which heretofore has been a source of trouble.

High temperature oxidation of mild or low alloy steels can be stopped or materially reduced by the "Alumicoat" process. Tests have shown that adequate protection against oxidation is provided at temperatures at least as high as the base metal has useful strength. Temperatures at which tests have been made with 10w carbon steel have exceeded 1900°F. At temperatures exceeding the melting point of aluminum, the aluminum diffuses into the steel forming an intermetallic compound of iron and aluminum. This diffused coating is well known as a refractory material and gives the steel maximum protection against high temperature sealing.

The following table shows some test data which reflects the protection given by aluminum dipping.

Steel Samples	Temp. Time Chg. In		
	°F.	Hrs.	Weight*
Untreated 18-8 Chrom. Nickel	1,350	24	-17.0%
Untreated 25-20 Chrom. Nickel	1,350	4	- 8.3%
Untreated 27% Chrom. steel	1,350	24	- 8.4%
Al-coated Plain Steel	1,350	192	0.1%
Al-coated 18-8 Chrom. Nickel	1,350	192	0.1%
Al-coated Plain Steel	1,700	48	0.3%
Al-coated 18-8 Chrom. Nickel	1,700	48	0.0%

*After corrosion scale was tapped off.

While aluminum alloys can be used for coating, pure aluminum offers best resistance to attacks of industrial gases and corrosive media, especially those containing sulphur compounds. In diesel engines, where there may be both elevated temperatures and sulphurous acid in the fuel causing corrosion, applications of the Alumicoat process are proving successful.

A brochure describing the "Alumicoat" process may be obtained by writing the Arthur Tickle Engineering Works, 21 Delavan St., Brooklyn 31.



Supervising & Operating Engineers Section

CONDUCTED BY R. L. GREGORY

MICHIGAN PANEL DEBATES DIESEL PROBLEMS

Since many municipalities belonging to the Michigan Municipal Utilities Association now are generating their power almost entirely by means of diesel engines, a demand arose for a forum on diesel operations. This demand was met at the fall meeting of the association. Panel members consisted of the following diesel plant superintendents: Henry LaFontaine, Petoskey; Thomas Moore, Lowell; J. B. Sims, Grand Haven; James Lockwood, Wolverine Co-op; and your author, acting as moderator.

"What do you consider as the most important objective of diesel plant operation?" was the first question put to the panel. In their own words, each man said, in effect, that "production costs per kilowatt hour generated is the matter of most vital importance." The panel then was asked what was deemed the controlling factor in production costs. The unanimous opinion was that "the prime factor of low production costs is the control of maintenance costs."

Mr. Sims stated that these costs could be lowered by a little thought and sweat on the part of the superintendents. To illustrate the fact that numerous opportunities arise for saving money, he said a superintendent can pour a bearing much cheaper than he can buy a new part. But if a part must be purchased, he recommended quantity purchases.

Mr. Moore then took up the subject of bearing repairs. He said that, based on his experience, he had found it "better to shop around a bit and find a company which does a repair job that will stay put, at a fair price." Most of the panel members agreed that bearing repair prices probably are better in the south, out in the west, and around the oil fields than along the eastern coast. They agreed, however, that some excellent work is being done by some concerns in the New York area.

Mr. Sims suggested that superintendents will do well to contact the Nickles

Machine Corp., Ponca City, Okla., who use the Kolene process for rebabbiting connecting rods and main bearings.

Another speaker said he had some good work done by Arthur Tickle Engineering Works, Brooklyn. Another panel member mentioned Lewis Lavoy, Brooklyn, as a firm which had done an excellent job on bearing repairs.

The moderator suggested, as another means for keeping repair costs down, using the Metal-lock process of repairing cracked cylinder heads, blocks, and other parts. Several present said they had used this method and had found it much cheaper than purchasing new parts. Because this repair is done by a cold process with no heat used, it was pointed out that no stress is placed on the part being repaired with the consequence that a sturdy job results.

The moderator cited his experience with such a repair in his Hillsdale plant. A piece of the shoulder in the block supporting one of the liners had broken. The piece was about 6 in. long by 2½ in. wide and tapered in thickness from one-half to one-eighth in. The trouble was reported to the manufacturer who said it would take several days to repair the block. It was proposed to bore out the block, make a ring to fit in place of the metal removed, the ring to be a tight press fit. The superintendent agreed on the method but not on the time element, since the unit was badly needed and the outage could not be afforded. A firm was called in that does repairs by the Metal-lock system. This firm cut out and milled the slot in the block, shaped another piece of similar metal, making it approximately .004 in. over-size, inserted it in the milled slot, Metal-locked it in, and ground it down to conform with the original shape of the block. The net result was that the engine was back in operation within 16 hours. Repairs cost about \$200,—a big saving over the manufacturer's suggested method. And the unit is still going.

Both Mr. LaFontaine and Mr. Lockwood discussed the maintenance of injection and nozzle equipment used in this maintenance work. Both stated that many dollars are saved each year by training maintenance men in the proper procedure for keeping costly equipment in good operating condition.

The panel underscored a statement made by one of its members. He said: "Let's not be misunderstood. We have nothing against the engine companies. We are not trying to tell you men to stay away from them. But often manufacturers do not have experience in fixing engines out in the field that compares with the experience gained over the years by superintendents."

Mr. Sims said: "You've got to strike a happy medium between what you must buy and what you can repair. When you hit upon the correct balance, a saving in maintenance costs will result." Mr. LaFontaine said: "You can't patch up your engines promiscuously. You've got to go along with what the engine manufacturer has designed and built. Factory executives are just as interested as anyone in the possibilities of you making as many repairs as you can. Certainly, you have to be careful; you can't expect a diesel operator to redesign an engine."

Out in the oil fields, Mr. Moore said, "they are not in the habit of running to the corner drug store for every part needed. Operators are out there by themselves and they have to make repairs on the job with whatever is at hand. Repair and maintenance was a crude process years ago, but it has developed over a period of time into almost a fine art. This art is not confined to the oil fields, but has been acquired by many other operators and maintenance men. One can almost say that mechanics are being born again because of the great American habit of doing things for oneself."

Toward the end of the meeting, the

discussion was thrown open and several additional points were made from the audience. It was agreed that enough problems remained untouched that the discussion could be continued at the spring meeting of the association.

Appoints Director of General Equipment Sales

The appointment of Charles J. Haring, as director of Equipment Sales for Westinghouse Air Brake Company was announced recently by Edward O. Boshell, chairman and president of the company. Mr. Haring, who will join the company's executive staff at Gateway Center, Pittsburgh, immediately, has been general sales manager of J. D. Adams Manufacturing Company, Indianapolis, Indiana. He has been with the Adams Company which builds road graders and earth-moving machinery, since his graduation from Purdue University in 1929. He has also been the company's export manager, Washington office manager, and Eastern sales manager. In Washington, he served as director of the Construction Machinery Division of the Commerce Department's National Production Authority.

Mr. Haring's newly created sales position is viewed by Westinghouse Air Brake executives as a logical development of the company's diversification program which was begun in 1951. He will assist in coordinating the sales efforts of these divisions and companies through the appropriate integration of their merchandising activities, in order to assure the most economic and efficient coverage of the many markets served by this general equipment group.

Retires

Ernest Hartford, 71, has retired as deputy secretary of The American Society of Mechanical Engineers after 43 years of service to that organization. He will continue to serve the Society in a consulting capacity.

OFFSHORE DRILLING SPURS DIESEL BUSINESS

Gulf Oil's M/V "Eagle" Uses Diesels in Varied Applications in Tapping Oil and Gas Reserves in Underwater Fields Off Texas and Louisiana

The search for offshore oil—some 10 to 12 billion barrels of it, believed buried beneath the Gulf—has spawned a new and amphibious family of machines and buildings in the ports of Texas and Louisiana. Growing numbers of floating warehouses and hotels, seagoing oil derricks and barges that become islands of steel on stilts are moving to drilling sites up to 30 miles out in the Gulf. And with these specialized devices go the ships and boats to maintain them.

The big oil companies launched their first drilling program off the Texas-Louisiana coast in 1946. Their goal was the "black gold" beneath the Gulf that would add 35% to U.S. onshore reserves. Between 1946 and late 1950, the makers of offshore equipment toted up \$150 million in sales. When the federal government and the coastal states began their fight for ownership of the submerged lands, however, oilmen stopped buying offshore equipment and settled back to wait for the tidelands squabble to end. When the Federal Tidelands Act became law May 22, 1953, oilmen started spending again. They already have invested more than \$50 million for new equipment and are expected to double expenditures in the next year.

Offshore drilling is expensive, therefore strictly a big company operation. The present "standard"

installation calls for a platform supported by piles on which the derrick, drawworks and drilling engines are mounted. To limit the size of the costly platform, the oil industry is using tenders as floating hotels and supply bases. Until recently, companies have been buying war surplus LST's and converting them, but now the tenders are being built new. A typical drilling platform costs about \$450,000 to erect. The rig mounted on it runs about \$550,000 and the tender costs an additional \$2.5 million. To this must be added the cost of crew boats for taxi service to and from shore, and onshore installations for storage and handling of equipment and supplies.

About 15 shipyards and marine construction outfits now are actively engaged in this new line of offshore equipment business. Exploration and drilling activities along the 800 miles of tidelands and the continental shelf have created an important market for diesels. An excellent example of the role dieselization will play in tidelands drilling and development is provided by Gulf Oil Corp.'s new drilling tender, the M/V *Eagle*. A former Navy LST, the vessel was converted to Gulf Oil specifications by Bethlehem Steel Co.'s shipbuilding division at Beaumont. Displacing 2600 tons, the 328-ft. vessel is propelled by two 900 hp. Cleveland GMC diesels. She has a 50-ft. breadth and a de-

signed load draft of 15 ft. and speed of 10½ knots.

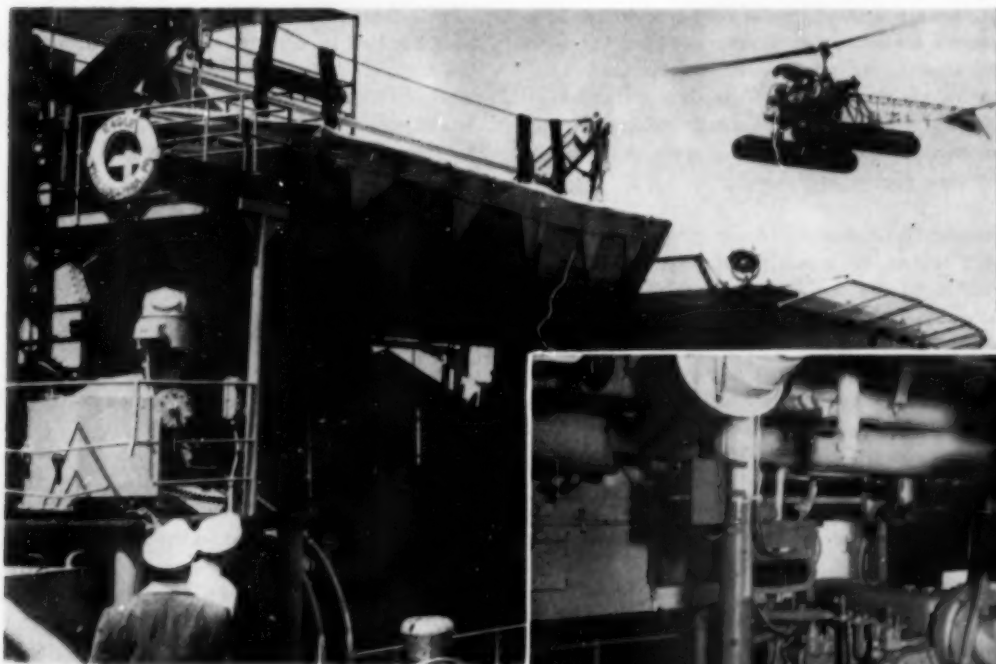
A feature of the *Eagle* is a specially-engineered mud pump unit incorporating three Gardner-Denver pumps driven by three Fairbanks-Morse opposed-piston diesels. The ship operates moored to a 48x106 ft. drilling platform built by Brown & Root of Houston. The *Eagle* is used for drilling pipe storage and handling, cementing operations, storage, and for housing the 70-men crew in air-conditioned quarters.

Transportation of drilling personnel to the site of Gulf's lease is largely by helicopter. Therefore, on the fantail of the *Eagle* is a 50x70 ft. heliport. It will accommodate a helicopter with a rotor diameter of 55 ft. and a gross weight of 6855 lbs., the size of the largest commercial 'copters now used.

The *Eagle* is equipped with radar, gyro and magnetic compasses, ship-to-shore telephone and the company's own FM radio system. On the boat deck are captain's quarters, radio and control room, and the heliport. On the main deck are staterooms, washrooms, galley, mess room, recreation and first aid spaces. Also, there is gear for mooring, loading and unloading, and cable tramway to form a bridge from ship to platform. On the second deck are locker rooms, laundry, machine shops, and storage space for oxygen, acetylene and carbon dioxide supplies, cement, and chemicals. The third deck carries active and reserve mud tanks, bulk mud and cement bins. Pipe rack and machinery space occupies the center line in a compartment 30x250 ft. extending upward to the main deck. Liquid storage tanks, chain lockers, engine space and shaft alloys are in the inner bottom of the vessel.

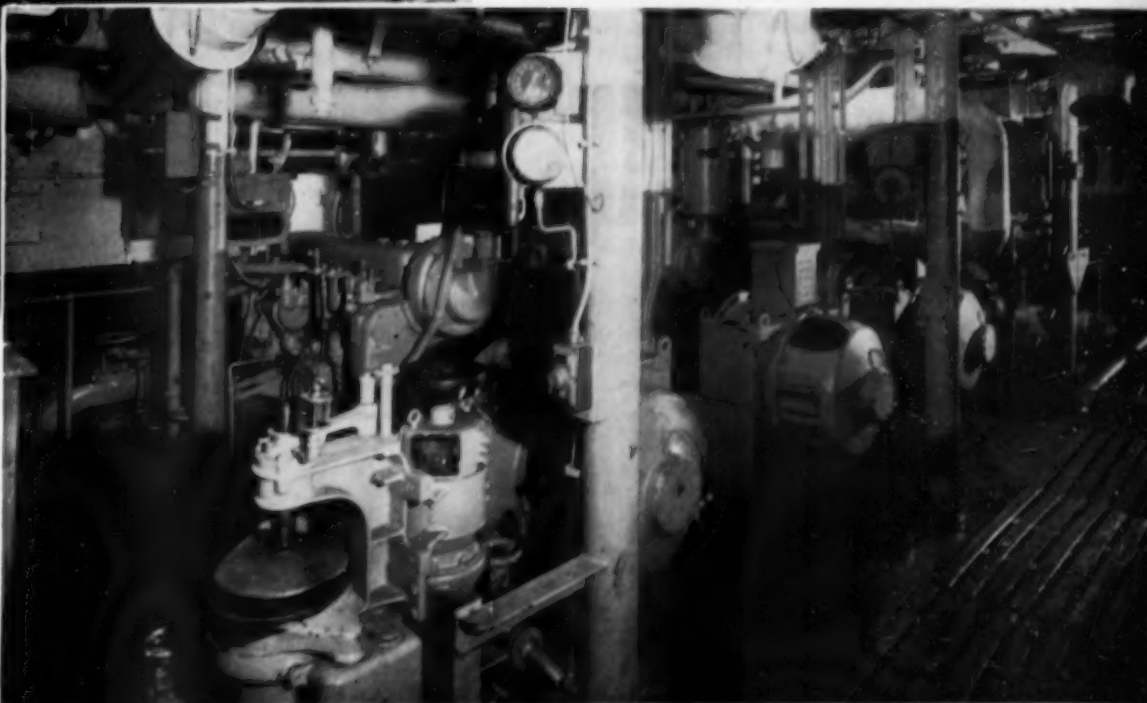
Ship bunkers provide space for 2890 barrels of diesel fuel and 224 barrels of lubricating oil. Mud pit tanks hold 1929 barrels and a caustic soda tank 100 barrels. Dry storage for bulk cement holds 2372 sacks and for bulk mud 3934 sacks. Waste oil and sludge is accumulated in a 135-barrel tank for periodic disposal. Two 550-barrel active mud pits, one on either side of the ship, are the usual source of supply for mud. Four 250-barrel reserve pits are provided.

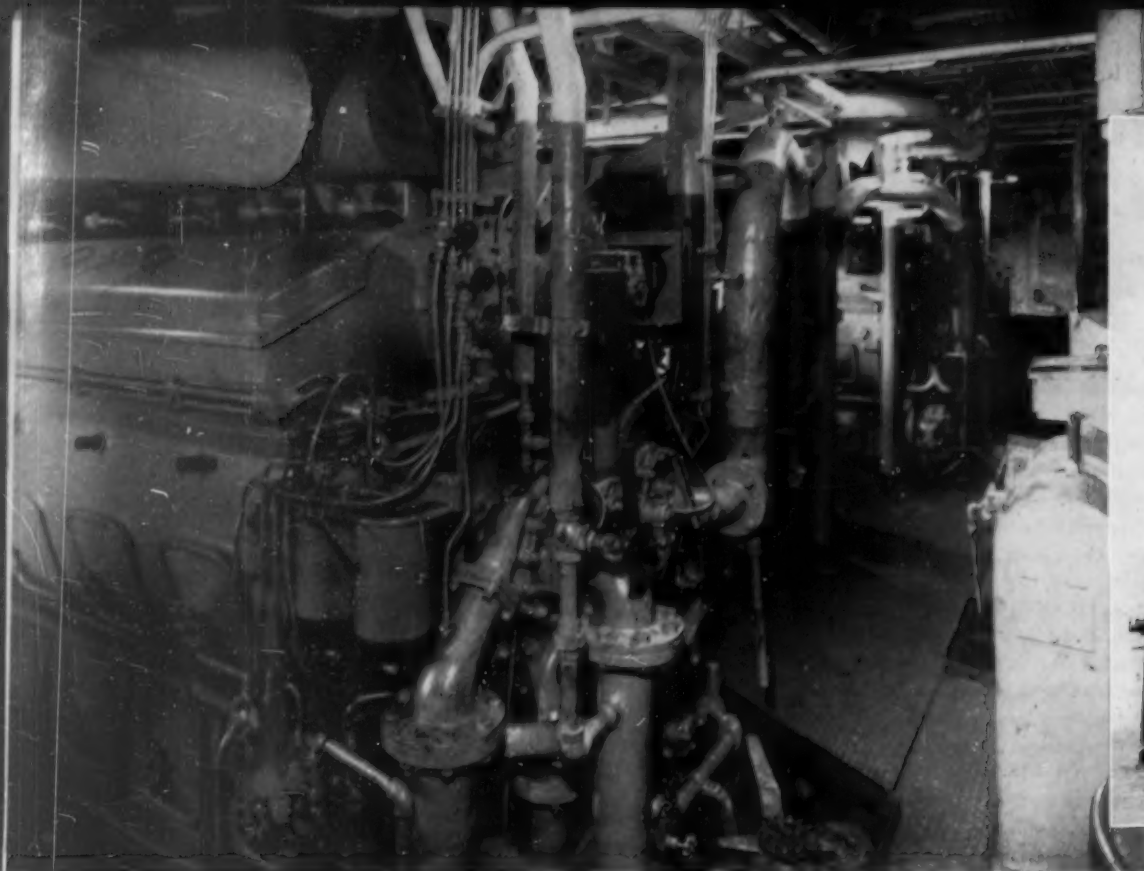
The *Eagle* is engineered from bow to stern to



Fantail of *Eagle* supports a 50x70-ft. heliport used to land personnel and critical supplies; accommodates largest helicopters.

Auxiliary power is generated by three Delco 100 kw. units. Two are driven by GMC Diesels, the third, in background, by a Superior diesel. Note Sharples centrifuge in foreground.





Two GMC Cleveland Diesels propel the *Eagle*. Governed at 744 rpm. by Marquette governors, they are rated at 900 hp. Each drives a 7-ft. 4-blade wheel through Falk reverse and reduction gears.



While working, the *Eagle* is moored to the drilling platform, ready, however, to jettison her chains and seek safety in case of a storm.

carry out the job of serving a drilling rig. In this method, the platform carries the derrick, draw works, rotary table, their accessories and driving engines. The tender is anchored alongside, providing the water, mud, pipe and supplies for the drilling. Drill pipe is transferred from the hold to the drilling platform in an efficient manner. Two fork-lift trucks, operating in tandem in the storage hold, move the pipe to the hatch where an overhead tramway picks it up and carries the pipe to the bow, which is nearest the platform when the ship is moored. Here the drawworks lines pick up the pipe to complete the transfer. The vessel has storage facilities for pipe, mud and cement sufficient for the completion of a 12,000-foot well.

The engineering design for the mud pump unit, which consists of pumps, engines, compounding transmission and electric couplings, with complete controls and instrumentation, was undertaken only after careful analysis of the special requirements to be met by the *Eagle*. In the first place, the various components had to be assembled in the confined space available in the engine pump room, leaving an adequate working space and passageways around the machinery. Secondly, the number, size and characteristics of the pumps had to provide not only for present drilling practices but for future changes in drilling techniques, such as the increasing use of jet bits which require more mud.

The two main drilling pumps are Gardner-Denver, 7½x18, Type GR-GXR, mud pumps, rated for this application at 750 input bhp. at 60 rpm. Each is driven by an 800 bhp. Fairbanks-Morse opposed-piston diesel. Only one pump is required for normal drilling but both are operated in parallel during fast upper hole drilling. A third, smaller mud pump, Type GR-GXP, rated at 550 bhp. at 65 rpm. is for normal mud mixing and transfer

and is driven by a 640 hp. opposed-piston diesel. Actually, this pump is a satisfactory substitute for one of the main drilling pumps.

The prime movers are three Model 38D8-1½ two-cycle, opposed-piston dual-fuel Fairbanks-Morse engines of 8-1½ in. bore and 10 in. stroke, developing rated horsepower at 720 rpm. Two of the engines are 5-cylinder units rated at 800 bhp. and one is a 4-cylinder unit rated at 640 bhp. Although a compounding type transmission is used, each engine has a continuous horsepower rating which enables it to drive one pump while providing enough surplus to take care of transmission losses between engine and pump.

Another feature of the *Eagle* is the use of dual-fuel engines in a marine application. Off-shore drilling platforms might serve for the drilling of as many as five wells from a single location. Thus, should natural gas become available from a completed well, the dual-fuel o-p engines can utilize this gas, requiring only a small quantity of diesel oil for pilot fuel. Each engine has an individual cooling system for jacket water and lubricating oil. The fresh jacket water is circulated by an engine-driven pump through the heat exchanger which is cooled by sea water. Lubricating oil is cooled in a similar exchanger.

Cementing equipment is leased from the Halliburton Oil Well Cementing Co. Machinery consists of a dual T10-AC skid-mounted unit with Hawco pumps, powered by three General Motors diesel engines. Two Model 6-110 engines drive cementing pumps and furnish 200 hp. each at 1600 rpm. The other engine, driving a mixing pump, is a Model 6-71, providing 110 hp.

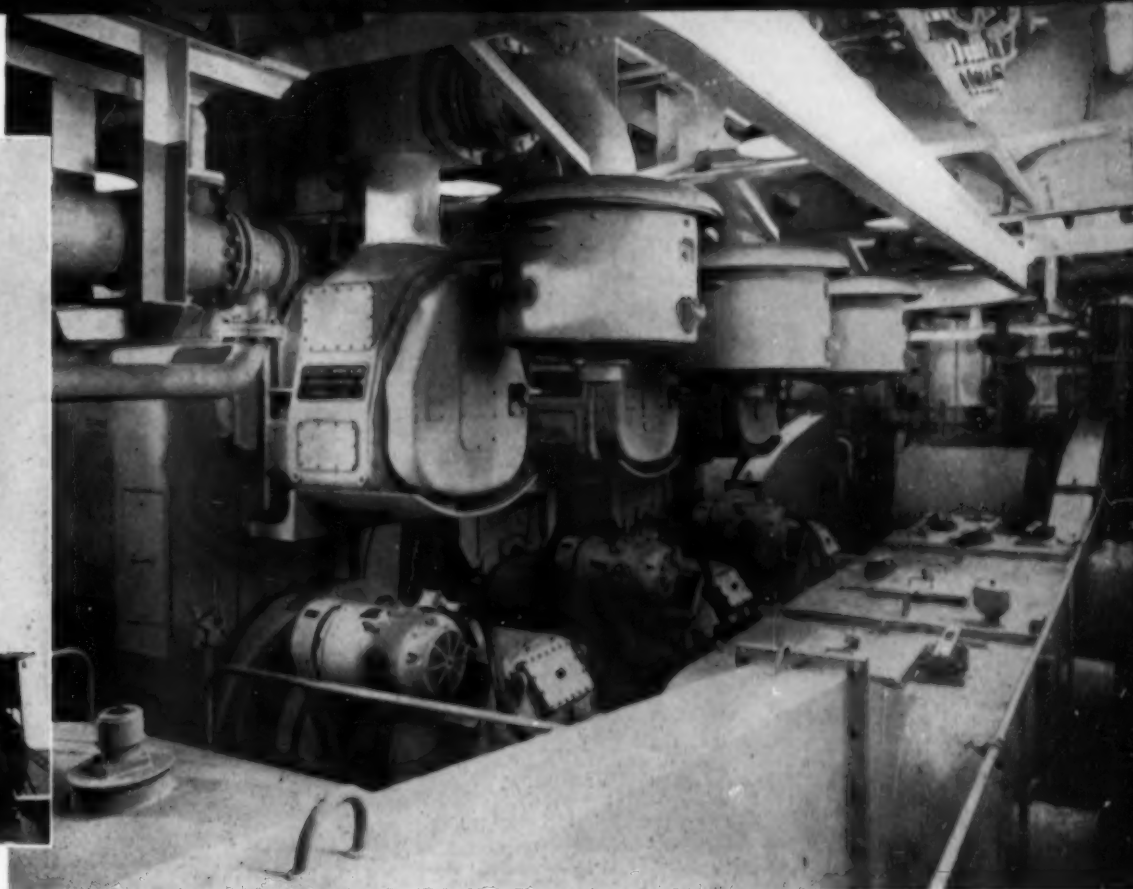
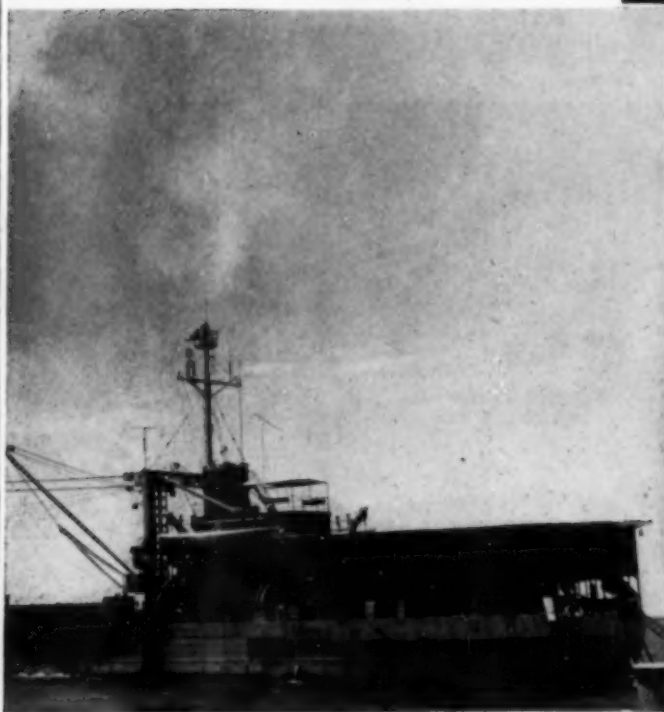
The ship propulsion General Motors diesels are

two Model 12-567, V-12 cylinders, 8½ in. bore by 10 in. stroke, furnishing 900 hp. each at 744 rpm. Three additional General Motors engines drive electric generators of 100 kw. shunt-wound 120-240 volt dc., 417 amp. One Superior engine of 150 hp. at 1200 rpm. drives another generator.

Prime movers on the crew boats used,—the *Cypress* and *Willow*, are four GMC Model 6-110s. Each boat has two in tandem. Drawworks engines on the drilling platform are three Caterpillar D-397s. These are V-12 engines, 5¾ by 8, delivering 400 hp. at 120 rpm. Two Cat D-311s drive 19 kw. 60-cycle, 3-phase 110-120 volt ac. generators. Air-conditioning is provided by a 40-ton Chrysler Air-Temp compressor driven by a 40 hp. 240-volt dc. motor. While Gulf Oil's *Eagle* is an outstanding example of the effort that is being put forth to tap off-shore oil and gas reserves, it is but one example of many. More than 125 other drilling rigs or oil field structures are listed by the Coast Guard as being in Louisiana's inland waters, alone. In addition, some 25 platforms are in navigable waters off the Louisiana shoreline.

Since the effective date of the Tidelands Act (May, 1953), eight fields have been discovered and added to those previously located off the Louisiana shore. They can be identified on the accompanying map. By name and drilling permit holder these latest discoveries are: Chandeleur Sound Block 1 (Phillips); Chandeleur Sound Block 69 (Texas); Main Pass Block 23 (California); Main Pass Block 24 (California); West Delta Block 53 (Continental); Eugene Island Block 18 (Shell); West Cameron Block 192 (Continental); and West Cameron Block 110 (Magnolia).

The controversy between state and federal governments as to the exact line of demarcation between



Dual-fuel, opposed-piston Fairbanks-Morse engines (two 800 hp. and one 640 hp.) drive the *Eagle's* three Gardner-Denver mud pumps. View shows Dynamatic electric couplings and exciters, Emco compounding transmissions, Vortex air filters.

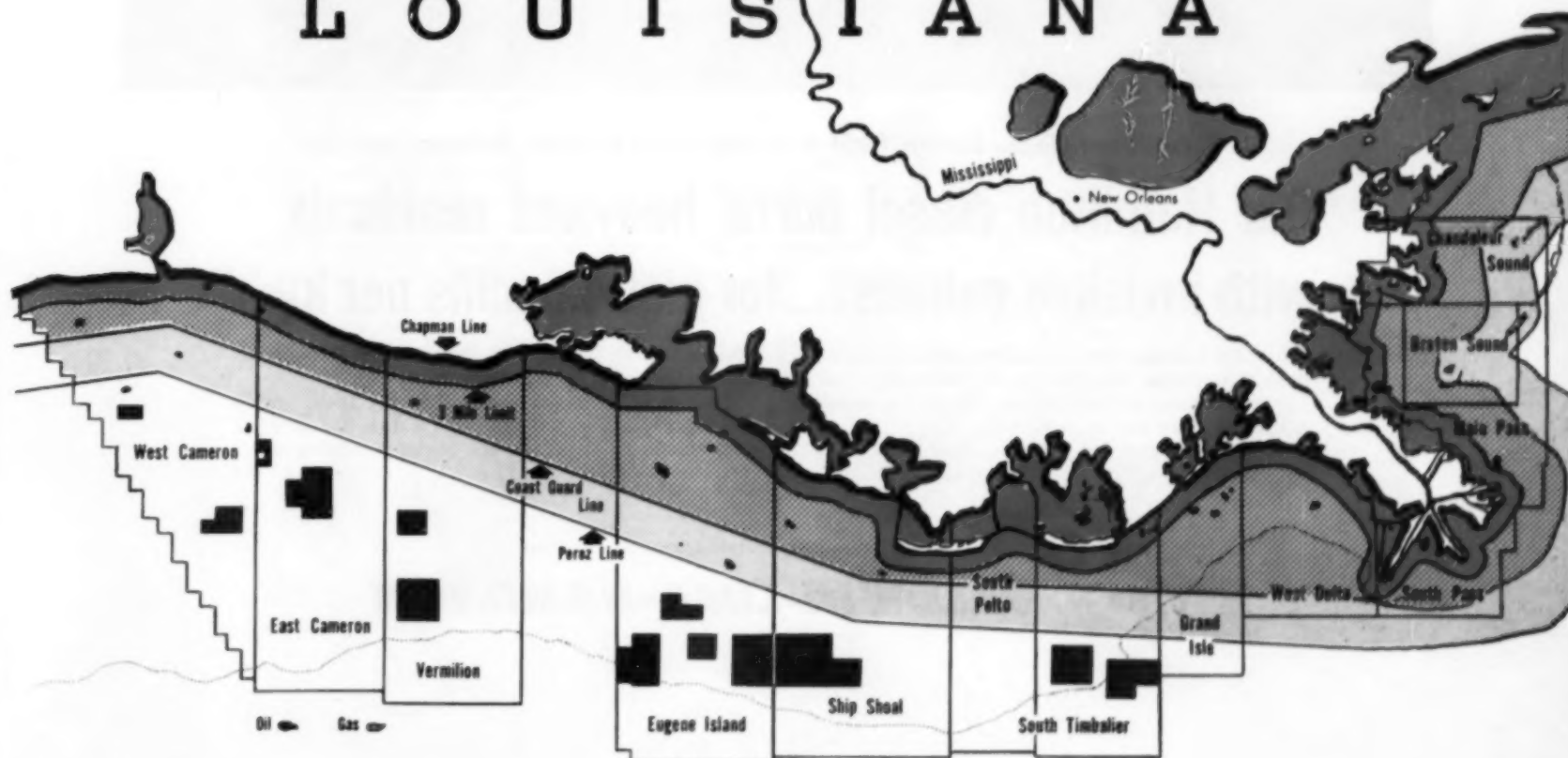
their offshore jurisdictions is still not completely resolved. A study of the various "lines" on the map will indicate the range of contention. The extreme claim of the federal government was named after Oscar L. Chapman, then secretary of Interior under President Truman. The extreme claim of Louisiana is represented by the Perez line, named after a leader in the state's battle. But regardless of the rival contentions, a truce is in effect which is satisfactory to oilmen. The boom in offshore drilling continues; it offers a potential of seemingly endless scope to the diesel engine industry.

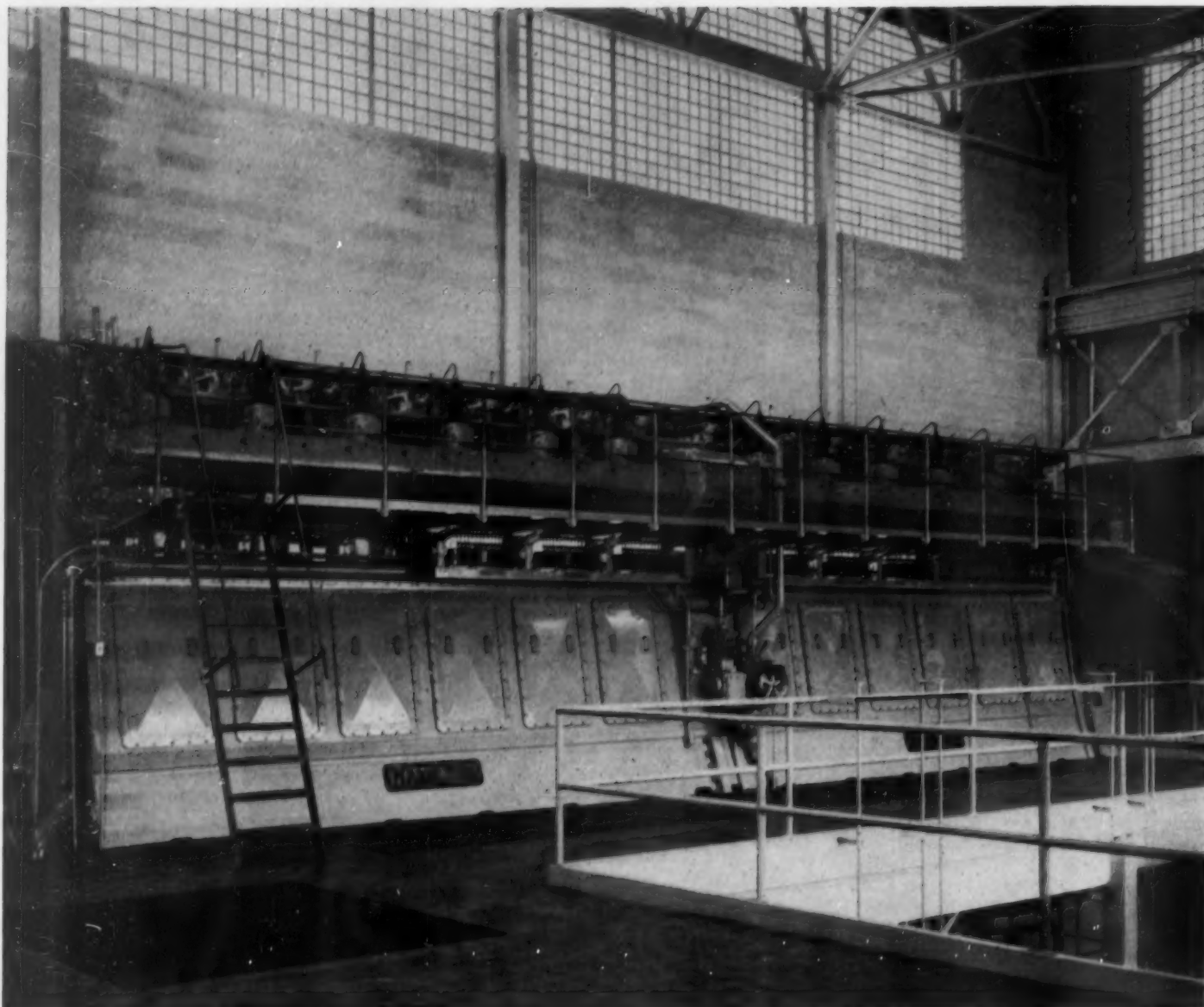
The coastal map below shows tracts offered for lease by the U. S. government on Oct. 13, 1954. All were outside the "Perez Line" which marks the boundary of submerged lands claimed by Louisiana. The Truman Administration created the "Chapman Line," and the Coast Guard has its own line to divide coastal from ocean waters. U. S.

Interior Dept. officials were surprised and happy when winning bids for nearly 100 leases brought almost \$130 million. Gulf Oil Corp.'s successful bids totaled \$36 million, headed the list. All doubt as to the seriousness with which big oil companies are viewing the offshore reserves was erased by the amount of bidding.

(This map is reproduced through the courtesy of WORLD PETROLEUM.)

LOUISIANA





L. C. Pettibone, Supt., Electric Light & Power Dept., Decatur, Indiana, reports:

"Our Hamilton diesel burns heaviest residuals with invisible exhaust...for just 4.6 mills per kwh"

"This 3810 kw Hamilton $21\frac{1}{2}$ x $27\frac{1}{2}$ engine is operating 18 to 20 hours per day, burning very heavy fuel (no. 6) with an absolutely invisible exhaust. We have experienced no unusual piston ring or liner wear.

"This engine provides for the turbulence at time of fuel injection and considerably more air in the cylinder.

That is why we can burn the very heaviest fuels on the market today . . . for just 4.6 mills per kwh.

"We extend a cordial invitation to any Diesel engine operators to visit our Decatur plant and see our complete fuel handling system and this Diesel generating unit," Mr. Pettibone concludes.



Hamilton Division, Hamilton, Ohio

BALDWIN-LIMA-HAMILTON



10 trucks replace 30 — cut costs 62%

WHEN 10 50-ton trucks equipped with Allison TORQMATIC DRIVES replaced 30 mechanical-drive 20- and 30-ton trucks at Sunnyhill Coal Company's New Lexington mine:

Operating costs dropped 18.6¢ per ton, Maintenance costs were cut 13.1¢ per ton,

And the TORQMATIC-equipped trucks now haul 32.6 more tons per truck hour.

But lower costs are only part of the story.

On-the-job accidents have dropped sharply. Drivers stay fresher, more alert because they now have no clutch pedal to push — quick-shift at full throttle with finger-tip hydraulic control—have only 3 shifts instead of 7 or 10.

Wet weather worries have almost disappeared—road maintenance costs are lower. Smooth power transmission by the Allison TORQMATIC DRIVES lets trucks drive through mud and muck—conditions that often shut down the mine before TORQMATIC-equipped units came on the job.

Big reason for lower operating and maintenance costs is shock-free power transmission by the *matched* TORQMATIC Converter-Transmission teams. The Converter absorbs shock loads instead of transmitting them along the drive line—protects engine, differential, drive shaft and transmission from damage.

There's an Allison TORQMATIC DRIVE for your 40- to 400-horsepower gasoline and Diesel equipment. New low-

cost 40-150 h.p. TORQMATIC Converters easily fit present equipment, are completely self-contained for simple installation. Get full details about Allison TORQMATIC DRIVES from your equipment manufacturer or dealer or write:

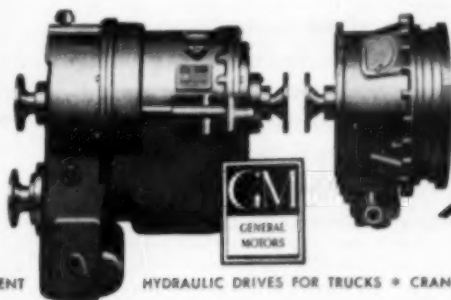
Allison Division of General Motors
Box 894D, Indianapolis 6, Indiana

ALLISON TORQMATIC DRIVES

**Unbeatable Team for Maximum
Operating Economy**

- **Quick-Shifts** at full throttle with finger-tip hydraulic control
- **Holds** power to load at all times—no clutch pedal to push—no gearshift guess
- **Reduces** maintenance costs by absorbing shock — eliminates engine lugging — prolongs equipment life
- **First** torque converter-transmission team designed to work as a *unit* and built by one manufacturer
- **Cuts** driver training costs

FIRST MATCHED
UNITS BUILT BY
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COMPACT, EFFICIENT

HYDRAULIC DRIVES FOR TRUCKS • CRANES • TRACTORS • SCRAPERS • SHOVELS • DRILLING RIGS

**Allison
TORQMATIC DRIVES**

West Coast News

By James Joseph

EXCERPTS FROM service reports covering the Army's unique power plant at its Sandia Base in New Mexico are available. There, fully automatic Union diesel dual-fuel engines come onto the line, parallel themselves, divide their loads and go off the line after their job's done. This standby power plant

recently kept confidential work going at the Base, despite outage of a public utilities high line, downed along Route 66 when rammed by a truck and trailer. Preliminary engineering was done under direction of Mr. Earl Craven, engineer at Sandia Base. Plant was constructed for the District Engineer by Robert E. McKee general contractor under supervision of the construction firm's vice president, J. R. Brennand.

FALCON A 44-ft. schooner owned by Douglass Brinton of Port Orchard, Wash., was recently installed with a new GM 4-71 with 3:1 reduction and direct drive front power take-off. Unit swings a 36X28 three-bladed Michigan prop. Sale thru Crofton Diesel Engine Co., Inc., San Pedro, Calif.

FOR THE vessel *Native Son*, owned by Orie Easton, Newport Beach, Calif., a

GM 6-71 main engine with GM hydraulic gear 3:1 reduction, swinging 37x29 Michigan prop. Also, a GM model 2061-A auxiliary for ship's ice machine and bait pump.

FOR BURT Lasswell's new 42-ft. cruiser, two of the new model GM 4-51 diesels. Cruiser was built by Anderson Cristofani, designed by Ed Monk. Sale thru West Coast Engine and Equipment Co., Berkeley, Calif.

TO COQUILLA Valley Lumber Co., Swiss Home, Ore., an 8DAS-1125 Buda diesel engine to power a headrig and sawmill, by Hamilton Engine Sales Inc., Portland.

FOR POWERING a LaTourneau Electric Logger, Frog Lake, Ore's Dwaine Knapp has purchased a Buda 6DAS-844.

PORTLAND'S J.E. Berkheimer Co. has installed a 6DTS-468 Buda in one of its Ford trucks.

FOUR 6DAS-516 Budas have gone to power TR-14 Wagner tractors, being built by Wagner Tractor Inc., Portland. Same company recently took delivery on two Buda 6DT-468s to power Wagner TR-9 tractors.

DELIVERED to Seattle's Berger Engineering Co., a 27 hp. 2-51 GM diesel power unit to drive a 50 cfm. air compressor on a large Berger Air-Tong Log Loader.

TRIPPLE & EVERETT Marine Ways, are building a new Edwin Monk-designed patrol boat (36') for the Washington State Dept. of Fisheries. Vessel is powered by a 4-71 GM marine diesel with 2:1 reduction, driving 27x21 prop.

FOR POULSBORO Oyster Co's new 50-ft. oyster dredge, a GM 4-71, model 4073A diesel. Engine equipped with GM hydraulic 3:1 reduction gear, turning a 36x24 propeller.

TO POWER the *Bunny G*, a 38-ft. purse seiner owned by George Gregory, Everett, Wash., a GM 4-51 with 2.5:1 reduction, turning a 26x16 prop. On trials, engine turned a top 2700 rpm., allowing cruising at 2400 rpm. and 8 knots. Installation by Evans Engine and Equipment Co., Inc. Seattle.

EVANS-ENGINE and Equipment Co., Seattle, has also installed the 38-ft. *Utopia*, a salmon and tuna troller owned by Seattle's Paul Hesby, with a GM 4:51, 3.5:1 reduction, replacing a 110 HP. gas engine with the same reduction ratio. Engine sits on the same beds and turns same prop, thus change-over costs were quite reasonable.

meet JUNIOR

JUNIOR UNITS, that is,—10 new dimensions for ads on the 4-column pages of DIESEL PROGRESS!

- ★ Junior Units use standard-size plates, allowing you to economize on production costs.
- ★ Junior Units attract attention . . . always will appear with editorial matter above and along one side of your ads.
- ★ Junior Units give you flexibility. Ten standard sizes lend themselves to any kind of presentation you may wish to make to our readers.

This ad, for example, is a full page—Junior Unit. Note that it dominates the page—the BIG page that permits DIESEL PROGRESS to make developments in the industry easily understood through dramatic use of illustrative material.

Drawings of two other of the Junior Units are reprinted here to indicate the flexibility they offer. Complete information and a Junior Unit rate card recently was mailed to advertisers and agencies. If you missed seeing these, refer to your media file or let us know. We'll send the circular and card pronto. They'll help you plan 1955 campaigns.

JUNIOR SPREAD—JUNIOR UNIT
840 Agate Lines
\$940.00
Two 7" x 10" plates or one undivided plate
15" wide and 10" deep

FULL PAGE—JUNIOR UNIT
420 Agate Lines
\$462.00
Plate size:
7" wide, 10" deep

ISLAND HALF PAGE—JUNIOR UNIT
210 Agate Lines
\$231.00
Plate size:
4 1/8" wide,
7 1/2" deep

DIESEL PROGRESS

816 No. La Cienega Blvd.

Los Angeles 46, Calif.

FOR THE 34-ft. *Honey*, a troller, a new 4-51 GM, with 3:1 reduction, replacing a 110 hp. gas engine with 3:1 reduction. Again, no prop or other major engine bed changes were needed.

SAUSE BROTHERS Ocean Towing Co., Garibaldi, Oregon, has purchased two Fairbanks-Morse 45 diesel engines.

"A Supplier Looks At Low-Cost Fuels"

Speaking at the Association of American Railroads, Eastern Purchases and Stores Regional Group meeting, recently, Mr. Harold V. Messick discussed the very pertinent subject of "A Supplier Looks at Low-Cost Fuels." Mr. Messick is technical advisor, national account sales department of Ashland Oil & Refining Company.

His remarks pointed up the fact that while low-cost residual fuels have been available for some time from some refineries, they do not have uniform specifications. For that reason care has to be exercised when deciding to burn these low cost non-standard fuels. Pour point, viscosity, sulphur content, cetane number and compatability characteristics along with stability in storage must be considered. These specifications warrant considered judgement before the use of non-standard fuels in valuable diesel equipment. There is no point, he stated, in saving one dollar in fuel cost if it means two dollars to pay for increased maintenance costs.

Low-cost fuel can be used but there is no universal low-cost fuel. Each one presents its own individual problem. Additional equipment may be necessary in the plant to process the fuel in order to make it acceptable for use. The lubricating factor cannot be overlooked.

Concluding his remarks, Mr. Messick stated, "There are so many variables involved that you will be well advised to approach low-cost fuels with caution . . . No one has all the answers ready-made. Through continued cooperation by the engine builder, the railroad and the refiner, we can prove the acceptability and effectiveness of every type of usable low-cost fuel in railroad diesel service . . . In the end you will get satisfactory fuels at low cost and the refiner will be able to increase the available supply of satisfactory fuels."

To Handle Koehring Products

Recently appointed exclusive distributor for the Koehring Company of Milwaukee, the Dalrymple Equipment Company of Memphis, Tennessee, will handle the complete Koehring line of heavy-duty construction equipment

along with products manufactured by the Parsons Company, Newton, Iowa, and Kwik-Mix Company of Port Washington, Wis. Both Parsons and Kwik-Mix are wholly owned subsidiaries of the Koehring Company.

New GM Diesel Distributor

The Detroit Diesel Engine Division of General Motors has announced the ap-

pointment of the Columbus Equipment Company of Columbus, Ohio as industrial distributor for GM Diesel engines.

The appointment was effective as of December 1. Complete factory-approved sales and service facilities have been established at 50 E. Kingston Avenue in Columbus with service cars and mechanics available for on-the-job servicing throughout the Columbus area. W.

F. Early, president and Vern Wheeler, vice president of the company have had many years' experience in the heavy-duty equipment field. Both were formerly connected with the Euclid Road Machinery Company (now Euclid Division of General Motors) and other equipment manufacturers. Richard A. Roberts is service manager and J. J. Scribner is in charge of the new diesel parts department.

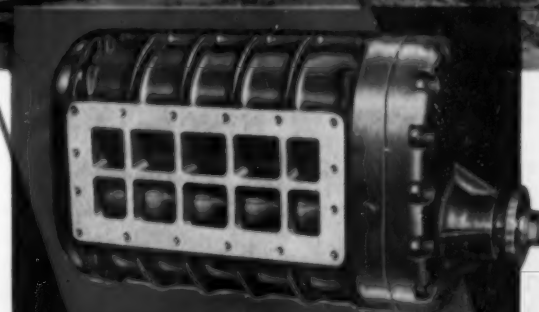
MAKING THE GRADE with Supercharged Power!



SUPERCHARGERS PUT EXTRA OOMPH IN YOUR ENGINES, REDUCE WEIGHT PER HORSEPOWER!

Pulling a 50-ton load of copper ore up an 18% grade from pit to crusher is rough and rugged work for any truck. But these big, fast-moving Diesels take the hill "right in stride" . . . thanks to Miehle-Dexter Supercharged Power. More than that, operators at this Arizona open-pit mine reported sharply reduced maintenance costs and big dividends in fuel economy when they switched to Diesel trucks equipped with Miehle-Dexter Superchargers.

MIEHLE-DEXTER SUPERCHARGERS have won universal acceptance on engines of leading Diesel engine manufacturers, including Buda, Cummins, Fairbanks-Morse, Murphy and others. If you, too, want to boost the horsepower of your engines by 50% or more . . . and decrease weight-per-horsepower, too, call on M-D engineers. They can specify the exact size and type M-D Supercharger for your engines, and you'll find the investment far less than required by any other method. Standard M-D models available for applications from 100 to 750 hp. Write for bulletin.



FOUR FEATURES PROVE MIEHLE-DEXTER SUPERCHARGERS BETTER ON THE JOB

- Patented end plate seals eliminate metal-to-metal contact, assure longer life, help achieve fuel savings.
- Rotor wear strips eliminate contact between rotors and housing, assure longer wear.
- Lightweight aluminum rotors and aluminum case boost engine horsepower, do not add weight, allow high speeds.
- All parts are standardized, allowing easy field service and interchangeability.



MIEHLE-DEXTER SUPERCHARGER

DIVISION OF THE DEXTER FOLDER COMPANY

100 FOURTH STREET • RACINE, WISCONSIN

Trust M-D Superchargers for internal combustion engines . . . use them for blower and air compressor operations, too.



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FOR "FULL FLOW"

Cartridges giving needed GPM from lowest to highest requirement. FULL-FLOW tanks for working pressures up to 100 psi.

2

FOR "BY PASS"

Where low pressure drop and high dirt pick-up is demanded on this widely used type of installation, BRIGGS has, for years, been THE SPECIFIED FILTER on large and small jobs.

3

FOR "SHUNT"

BRIGGS FILTER TANKS are equipped with adequate relief valve capacity and can take "THE MAXIMUM FLOW WITH FASTER, CLEANER OUTPUT OF FILTERED OIL."

THERE IS A BRIGGS FILTER TANK and cartridge to fit every filtration need . . . WIDE INTERCHANGEABILITY AND FLEXIBILITY with lower initial installation and operating costs.

4

WRITE FOR YOUR



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THE BRIGGS FILTRATION CO.
DEPT. 34, RIVER ROAD
WASHINGTON 16, D. C.

Appointed Manager of Operations



John H. Sheusner

Wm. Clausen, executive vice president of General Metals Corporation and general manager of its Enterprise Division, announced the appointment of John H. Sheusner to the position of manager of the Enterprise Division. Mr. Sheusner has been associated with Enterprise since February of 1945 and will in his new post have complete charge of all engine research, development and engineering activities together with manufacturing in all of its phases.

To Manufacture Marine Reverse-Reduction Gears

Hindmarch oil-operated reverse-reduction gears for marine transmission applications will be manufactured and sold in the United States by the De Laval Steam Turbine Company, Trenton, New Jersey, under an agreement recently concluded with Oil-operated Gears and Transmissions, Ltd., of England, who developed the equipment. This unit has been known commercially as MWD (Modern Wheel Drive) reverse-reduction gears.

The first U.S. installation was made in the twin-screw towboat *Southern*, operated by the Union

Barge Line and built by Dravo Corporation, Neville Island. (See article in DIESEL PROGRESS, March, 1954) Performance has been outstanding throughout a year of rigorous service on the Mississippi River, where frequent and abrupt maneuvering imposed a heavy strain on all transmission elements. The success of the gears has resulted in four orders to De Laval for similar units, which are now being manufactured at the De Laval Trenton plant.

The British manufactured reverse-reduction gears in the *Southern* transmit 1,750 bhp. at an engine speed of 600 rpm. reduced at the propeller to 210 rpm. ahead and 233 rpm. astern. Similar units now in production at De Laval embody standard American practice and components wherever possible, therefore, bearings, thrust bearings, tooth forms, and many other items will be familiar to American users. The clutch and controls are constructed in accordance with established British designs, which have proved themselves eminently satisfactory under the most exacting service conditions. The clutch consists of two inner and two outer units. It is operated by oil directed under pressure into the chamber between the inner members.

The design principles and reversing characteristics have been successfully demonstrated in Europe over a period of many years in a wide variety of applications, including locomotives, small naval vessels such as minesweepers and larger commercial vessels including tugs, trawlers, ferryboats and cargo vessels. A total of 10,000,000 bhp. are in use.

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Diesel heads with genuine Guth Company renewed heads . . . guaranteed equal to new. You save up to 50% in cost . . . and get your equipment back into service quickly. Guth prepays outbound freight — return your damaged part after the renewed one reaches you. You'll save time and money with Guth:

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NORDBERG
Duafuel® Engine
helps
Garland, Texas
keep pace with
**INCREASED
POWER DEMAND**



• One of the fastest growing towns in the United States, Garland, Texas is composed of over 17,000 progressive minded citizens. Just 14 miles northeast of Dallas, Garland is located in the heart of the north Texas rich blackland farming region.

In keeping with this rapid growth, and with an eye to the future, responsible officials have made sure that Garland's power plant has maintained a steady increase in capacity, to meet the ever-increasing power demand.

Backbone of Garland's efficient, economical power generation facilities are four reliable Nordberg Duafuel® Engines, installed at intervals to meet the increasing demand. The most recently

installed unit is a 2-cycle, 10-cylinder Nordberg low pressure Duafuel® engine rated 4,580 hp, 3,500 kw, at 240 rpm. This fourth Nordberg repeat order was preceded by another 2-cycle low pressure Duafuel® unit rated 3,010 hp, 2,100 kw . . . and two 4-cycle supercharged Duafuel® engines each rated 1,200 hp, 855 kw.

Today, with four dependable Nordberg engines capable of generating over 7,000 kw, citizens of Garland can point with pride at the continued growth of their city and its power facilities.

Next time you are thinking of power, think of Nordberg . . . builder of America's largest line of heavy duty engines, from 10 to over 10,000 horsepower.

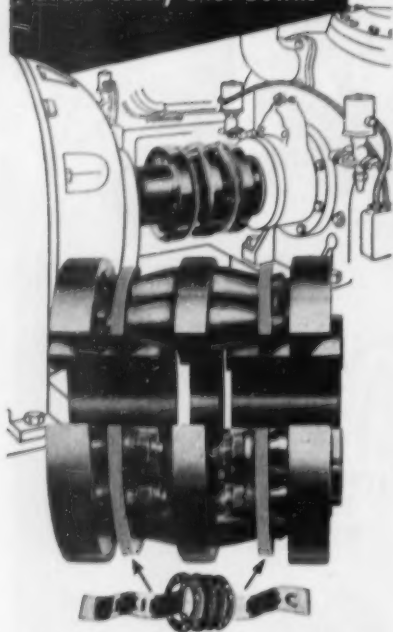
NORDBERG MFG. CO., Milwaukee, Wis.



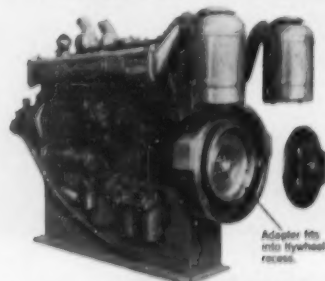
P754

Specify THOMAS ALL METAL FLEXIBLE COUPLINGS

for Power Transmission to avoid Costly Shut-Downs



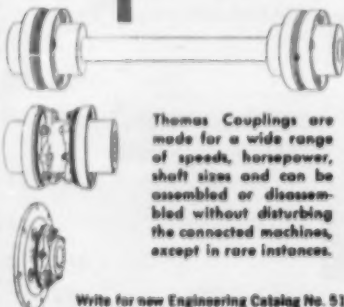
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.



Typical Flywheel Adapter Application

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

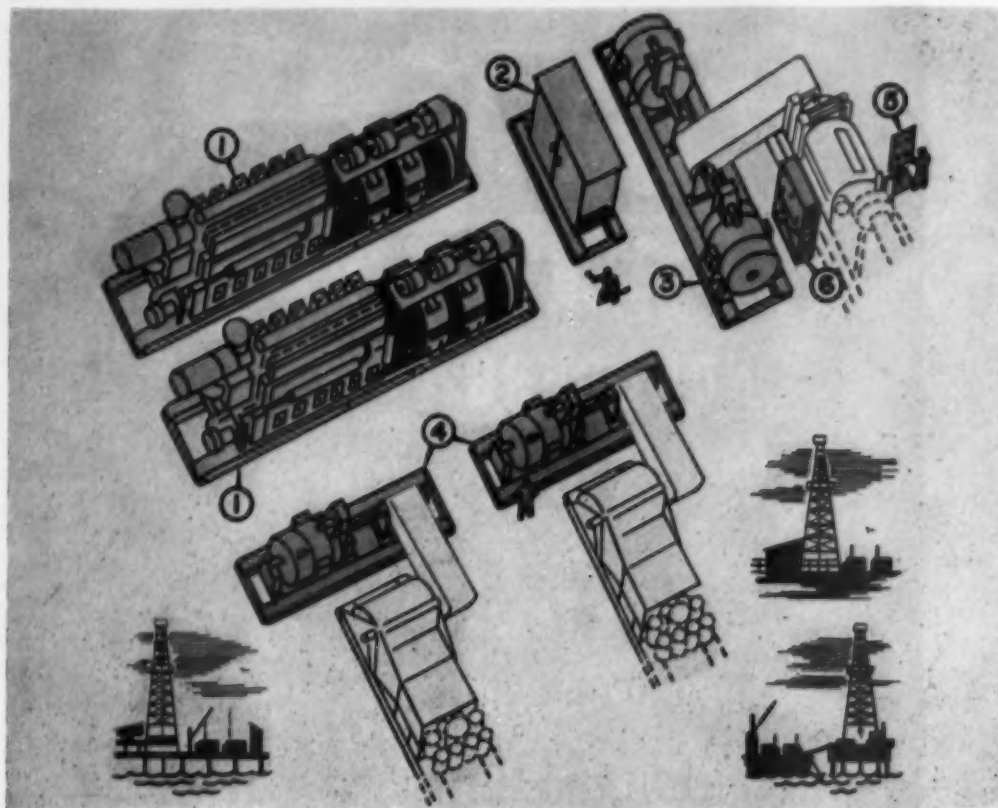


Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

ALCO POWER PACKAGE FOR DRILLING RIGS



An artist's conception of Alco's standardized diesel-electric oil drilling rig power plant showing: 1. two diesel generator sets, each consisting of a diesel engine, two main generators and an auxiliary generator; 2. main control panel; 3. two draw-works motors; 4. two mud pump motors; 5. driller's control stand; 6. driller's control cabinet. The plant is designed as an integral package to furnish all power requirements for offshore or land well drilling.

The oil industry's first "standard package" electric-power drilling rig was announced at the American Petroleum Institute's annual convention recently. Introduced by American Locomotive Company after two years of development, the diesel-electric plant is designed as an integral package furnishing all power requirements for offshore or land drilling. Alco is the first manufacturer to assume responsibility for design and coordination of a complete diesel-electric power plant for oil well drilling.

The new "standard package" power plant is priced to sell at about the cost of a conventional power rig while the relatively few diesel-electric power plants now used for oil drilling have been custom designed, and have been comparatively high in price. According to John Thomas, Alco marketing manager for stationary diesel engine applications, major oil and drilling companies have expressed keen interest in the new power plant and are particularly attracted by the fact that it can easily replace a steam rig at a competitive cost. The Alco package plant consists of eight skid mounted components with the power generated by two diesel-generator sets, each consisting of a diesel engine, two main generators and an auxiliary generator for extra power needs. Two motors, mounted on one skid, drive the drawworks, which raises and lowers the drilling bit and drill pipe.

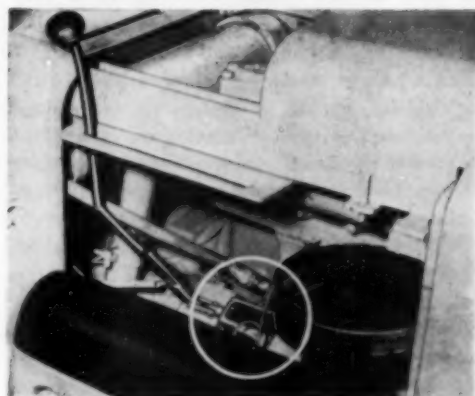
Two pump motors circulate the drilling mud. A main control cabinet mounted in front of the two diesel-generator sets distributes the power at

required. A driller's control cabinet and control stand complete the package.

The flexibility of the package permits the driller to run the drawworks, pumps, rotary table or other drilling apparatus singly or in combination. The standard package is so designed that a third diesel generator set for extra power, or other modifications, can be made through simple additions to the control panel. No matter what modifications are made, the control system is so simple that a driller can operate the rig with push-button ease. In commenting on the new power rig, Thomas stated that Alco had built the first successful diesel-electric locomotive in 1924. "Dieselization brought about remarkable savings to the railroads," he said. "Comparative savings in maintenance and operating costs can now be realized by the oil companies through dieselization of existing steam-powered drilling rigs and the application of this package plant for new rigs. We are confident that the Alco package power plant will pay for itself out of savings, just as the diesel locomotive has done for the railroads," he added.

With six plants in this country, including one in Beaumont, Texas, American Locomotive has been a major producer of engines for the pipeline industry, and of heat transfer equipment for the petroleum refining industry, as well as a major producer of diesel locomotives. The new package power plant will enable the company to strengthen its coverage of the oil industry for which it produces valves, blocks and wellhead equipment.

Starting Without Batteries



Fork lift trucks have become an essential tool of industry and commerce, yet, until recently, it has been impossible to utilize them in certain types of work because of the hazards involved. Danger arose from hot metal surfaces, electric sparks, hot exhaust gases, and sparks blown from the exhaust. There was also constant danger of explosion, and from carbon monoxide gases, in closed spaces, such as in ships.

Most of these limiting factors apply specifically when gasoline engines provide the power. Electric power also presents some dangers, but short battery life between chargings is the major handicap. Diesel engines were introduced in fork lifts in 1950, but they had some objectionable features, too. The principal trouble was with smoke, and its odor, in poorly ventilated spaces. Also, there was danger from sparks and arcing when the diesel engine was started electrically.

Engineers for the Buda Co., a division of Allis-Chalmers, began giving special attention to adapting diesels to fork lift service. The result is a new series of "safety diesel" fork lift trucks in the 3000 to 4000 lb. capacities, with developments under way to include all Buda models through the 7500 capacity.

The startling problem was solved by the simple step of utilizing the Hydrotor cranking motor manufactured by Hydramotive, Inc., Cleveland. This hydraulic starting motor is operated by the driver from his position on the truck merely by releasing a conveniently located mechanical lever. Energy for the cranking motor is taken from the hydraulic accumulator. The accumulator, easily accessible, is initially filled by a manually operated pump, located adjacent to the driver's seat. Thereafter, constant pressure is maintained by the truck's standard hydraulic pump.

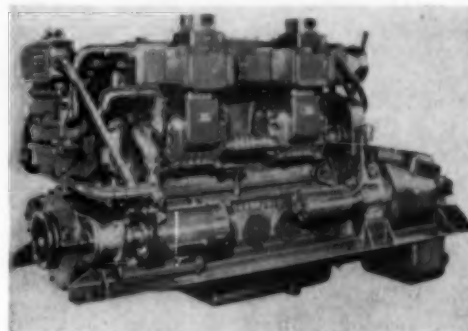
With the elimination of the battery, a generator is not needed. Electrical dash instruments have been replaced by mechanical or pressure-operated instruments. Buda engineers contend combustion is so complete in their engines that smoke and odors are practically eliminated. They have further reduced the inherently low temperatures of diesel engine surfaces by means of a water-cooled exhaust manifold. A water muffler also is used which prevents sparks from being exhausted. The

safety trucks are constructed so sparks from tires and the forks are eliminated.

Opens Educational Exhibit

A unique educational exhibit of basic industrial machinery opened to the public by Worthington Corporation in December at 99 Park Avenue, New York. The new exhibit illustrates basic operating principles of machinery related to business, industrial, community and home life. The opening ceremonies were headed by Worthington Corporation's president Hobart C. Ramsey.

More Power, Lighter Weight



Visitors to the New York Boat Show in January will see the first "show" showing of the recently announced higher performance P & H marine diesel engines. The 1955 models will be offered in sizes from 30 to 255 horsepower. Bore and stroke of each model is the same: 4.5 in. x 5.5 in. with a displacement per cylinder of 87 cubic inches. Increased horsepower and higher operating speeds tend to make the Series C-18 P & H diesel even more appealing to pleasure craft owners as well as commercial vessels. All models incorporate many new design advancements which, the manufacturer states, make the new engines the most powerful for their size, the lightest weight for their power—both important factors in marine applications.

Because P & H diesels are of 2-cycle design, they deliver power every downstroke of the piston; there is no coasting stroke. The inherent simplicity of these diesels is shown by their fewer parts, which the manufacturer lists as up to 20% fewer than some designs. This makes them easier to understand and also maintain by boatmen completely inexperienced with diesel engines. The new series continue the same P & H "Unitized" power assembly. With this patented feature, it is possible to replace an entire cylinder assembly (or each component), consisting of head, liner, pistons, rod, in a single easy-to-handle unit. This is achieved in a matter of only 40 minutes, the builder states. After years of service, replacement of the P & H Power assembly rewards the owner with virtually a new engine. An important development pointed out by Harnischfeger Corporation in its 1955 models is the precision-machined dual port design.

A choice is offered of hydraulic or manual reverse gears as well as various reduction drives and optional front-end power take-off equipment. Electric generating sets up to 100 kw. are also in the P & H line for 1955. Complete illustrated literature is now available by writing the manufacturer: P & H Diesel Engine Division, Harnischfeger Corp., Crystal Lake, Illinois. Ask for the Marine Bulletins.

it's what's inside that counts



THE EFFICIENCY OF

Luber-finer

PATENTED PROCESS

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HAS NEVER BEEN EQUALLED

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SINCE 1936

**DON'T BE MISLED
BY PRICE ALONE!**

There is no substitute for DIESELPAK'S Patented Filtering Process for H.D. Compounded oils AT ANY PRICE. The DIESELPAK cleans more oil faster—keeps it CLEAN longer—and gives more service and better engineered protection than any other filtering element. It PAYS to get the BEST!

✓ Protects engine

The DIESELPAK is designed to remove not only ABRASIVES but also CONTAMINANTS such as moisture, carbon, acid, etc., from oil, and is engineered to keep the filtering media and the removed contaminants from migrating back into engine.

✓ Extends periods between drains

The DIESELPAK collects and holds even the most finely dispersed contaminants without affecting or removing compound additives from the oil. A glance at the dip stick will show that the oil is CLEANER—symbol of better lubrication and longer oil life enjoyed only by Luber-finer users.

✓ Takes less oil

The DIESELPAK because of its engineered construction requires 2 to 4 quarts less oil than spongy substitute filter elements being offered for use in the Luber-finer housing. This is an additional saving enjoyed when using the DIESELPAK.

LUBER-FINER PACKS AVAILABLE:

- 1. REFINING PACK**—Introduced to the public in 1935 for use with straight mineral oils, fuel oils, hydraulic oils, and inhibited industrial oils.
- 2. DIESELPAK**—First made available in 1941, the DIESELPAK was primarily designed for use with H. D. detergent compounded oils and has also achieved outstanding results when used with fuel oils and straight mineral oils.

Write for complete information to Dept. 35

LUBER-FINER, Inc.

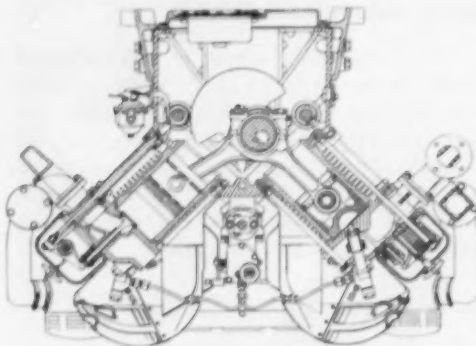
2514 S. Grand Ave., Los Angeles 7

European Diesel News

By Hamish Ferguson

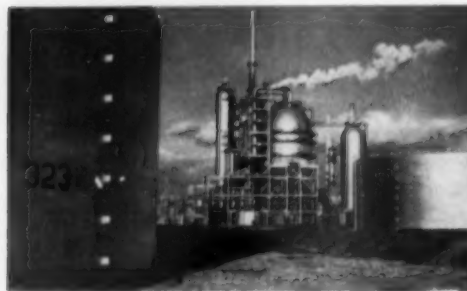
PETTER-McLAREN AIR-COOLED DIESELS. Two new designs have been brought out by Petter-McLaren and the engines are being built by J & H. McLaren Ltd., Leeds. The PD type are built in 2, 3, and 4 cylinders arranged vertically, and they develop 13, 19, and 26 bhp. respectively at 1,000 rpm., increasing to 24, 36, and 48 bhp. respectively at 1,800 rpm. The PDV type are built in 6 and 8 cylinders arranged with two banks in vee-form. They develop 40 and 53 bhp. at 1,000 rpm. increasing to 72 and 96 bhp. at 1,800 rpm. Bore and stroke of both types are 4.5 in. by 4.33 in. and it will be

noted that it is more than a "square" engine. Air-cooling is by means of a belt-driven axial flow fan and cowling.



DAVID BROWN ORDERS. The Ministry of Supply have recently placed orders valued at over £100,000 with David Brown Tractors Ltd. Huddersfield, for the supply of industrial wheeled tractors. These machines will be used on U.K. airfields for general towing duties and salvage operations. Two types of tractors are included in the order, the 30 IDT which has a four-cylinder 34 bhp. diesel engine and a new type single-stage turbo transmitter, and the 30 IC having a four-cylinder 41 bhp. diesel engine with 4-speed gearbox. Maximum road speed is 22 mph.

ESSO REFINERY. The Esso Petroleum Company's refinery at Fawley, just outside Southampton, is the largest operating in the United Kingdom. During the first three years approximately 18¼ million tons of imported crude, almost all imported from the Middle East, have been processed. In addition to the normal products of a refinery, the sulphur recovery plant yields 14,000 tons of pure sulphur per year. A new plant is being constructed at the refinery at the present time which will be the first of its kind in Britain. It is a "hydroformer" which will process crude oil fractions by reforming molecules in the presence of a catalyst, and in an atmosphere of hydrogen, for a high quality petrol.



NEW ATLAS COMPRESSOR. The Atlas Diesel Co. Ltd., Wembley, London, have introduced a new small portable compressor powered by the 6-11 single-cylinder air-cooled diesel built by Armstrong Siddeley Motors Ltd. of Coventry. The compressor is of the single stage, air-cooled, vee-form type, and is driven from the engine by four vee ropes. A clutch is incorporated to permit easy starting of the engine. The compressor and engine are mounted on two cylindrical air receivers which form the chassis. Capacity is 37 cu. ft. at 80 psi.

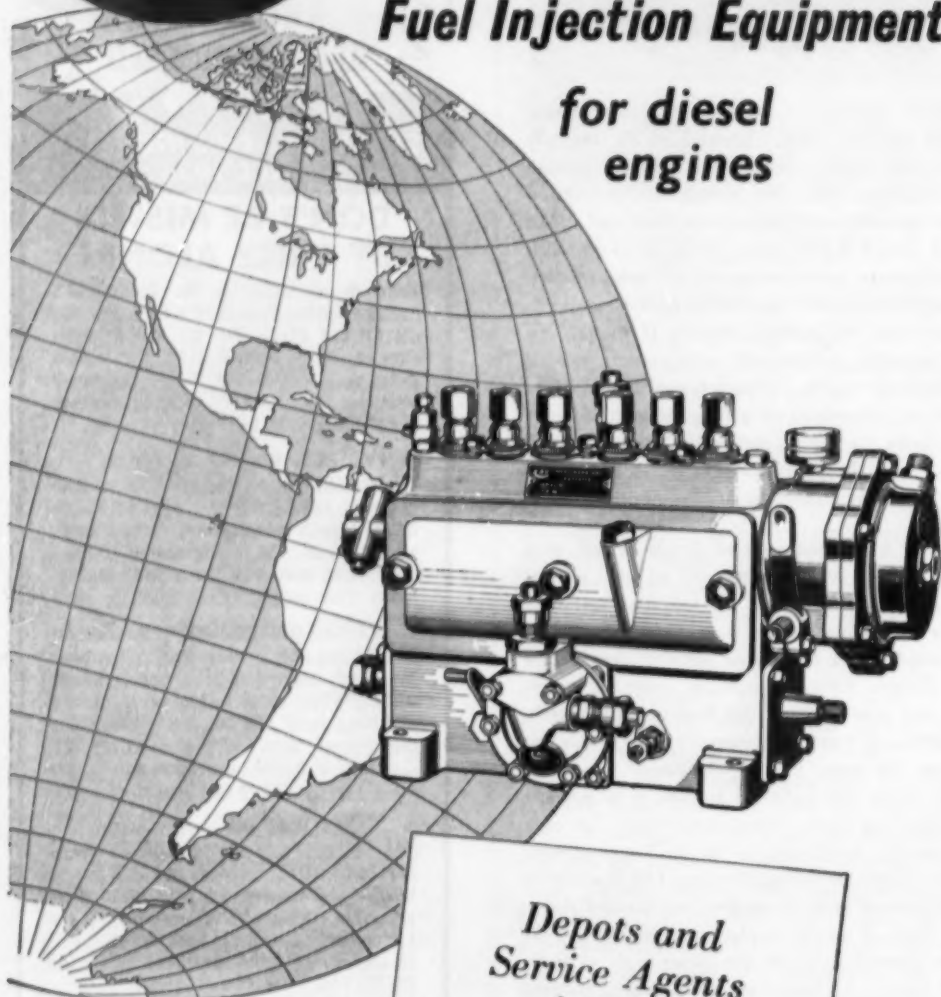


BRITISH UNITED TRACTION LTD. A special 486 mile trip was recently organized by British Railways in two diesel trains built by British United Traction Ltd., Leyland, Lancs. Each train consisted of three units, two power cars and a trailer car. The power cars are driven by twin 125 bhp. vertical diesels. A fuel consumption of 13 mpg. per engine was recorded, with speeds up to 69 mph. on level track. Gradients of up to 1 in 38 were negotiated.



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Fuel Injection Equipment**

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Fuel Injection and Electrical Equipment

FORD MOTOR COMPANY EXPANSION. It has been announced that the Ford Motor Co. Ltd., Dagenham, Essex, is to carry out an expansion programme during the next five years. The cost is estimated at £65 million and will provide for additional factory floor space of about 4,000,000 square feet as well as the modernisation and re-equipment of existing manufacturing facilities.

NEW DORMAN DIESEL. A new industrial diesel has been announced by W. H. Dorman & Co. Ltd., of Stafford. The 3 LA is a water-cooled vertical four-stroke engine with bore and stroke of 4.72 in. by 5.12 in. and it is rated at 47.5 bhp. at 1,700 rpm.

NAPIER ELAND. A contract has been signed between D. Napier & Son Ltd. Acton, London, and the Convair Division of the General Dynamics Corporation of America for the purchase by Napier of a Type 340 Convair-Liner. The aircraft will be fitted with Eland turbo-prop engines, and after flight testing the new airframe engine combination will be demonstrated to air line operators in Europe and North America. The Eland engine is now producing more than its designed power of 3,000 chp. and a version of the engine with the power output increased to at least 4,000 chp. is already in development.

LEYLAND "NO-CLUTCH" GEARBOXES. The advantage arising from the abolition of the clutch pedal, made possible on British buses by the introduction of the pneumo-cyclic gearbox, are making a strong appeal to export buyers. Leyland Motors Ltd., Leyland, Lancs, have received orders for 1,000 of these units, mostly for fitment in Leyland buses now in production. More than 300 will be installed in buses for Belgium and Holland. Many of these buses are the rear engine type which are becoming increasingly popular on the Continent.



DEUTZ AIR-COOLED ENGINE. At the Public Works and Municipal Services Exhibition at Olympia, London, the firm Klockner-Humbolt-Deutz A. G. displayed eleven different types of air-cooled diesel engines. The largest was a 12-cylinder V-type, four-stroke engine developing 150 bhp. at 1,500 rpm. with a bore and stroke of 4 3/8 in. by 5 1/2 in. The smallest engine is a single-cylinder vertical four-stroke developing 10 bhp. at 2,000 rpm. Deutz were the only German exhibitors in the show.

Expansion Program

Dr. Hendrik van der Horst, President of the Van der Horst Corporation, has announced a \$400,000.00 expansion program for the corporation's Texas plant, located in Terrell, Texas, 30 miles due east of Dallas on U. S. Highway #80. The Van der Horst Corporation, specialists in heavy industrial electroplating, has additional plants in Hilversum and Zwolle in the Netherlands, and

Olean, New York. The Spar-Tan Engineering Corporation of Los Angeles is the West Coast licensee for Van der Horst processes.

An increased demand in the South and Southwest for Van der Horst's patented iron and chromium plating processes, Vanderloy and Porus-Krome is credited by the corporation for necessitating the expansion. The two processes are used extensively for the reclamation of worn cylinders of internal combustion engines used in the railroad, marine, aviation, power, oil, and gas industries. In addition, seven manufacturers of engines for these varied industries incorporate Porus-Krome processed liners as standard in engines of their manufacture.

The Terrell plant, established in 1952, has been

limited in production by an existing 18,500 ampere plating capacity, and a more than one hundred per cent increase to 40,000 amperes is one of the major factors in the expansion program. Facilities for iron plating are also being added.

Maine Distributor Appointed

Harris Co., Inc., of 188 Commercial St., Portland, has been named distributor of Lister diesel engines in Maine. The appointment was announced recently by the engine division of National Supply Co., U. S. distributor of Lister engines. Harris Co. is one of Maine's largest marine and general supply firms. It was founded in 1921 and is operated today by the brothers and sons of the founder.

HARBORMASTER

Outboard Propulsion and Steering Units

your complete marine power package



Easily installed for immediate use.

Mount with four hold-down bolts . . .

and you're ready to operate.

Specifications:

Sizes available from 20 to 300 h.p., gas or diesel power. Model 0-41H (illustrated).	
Engine H.P.	50
Engine R.P.M.	2300
Propeller diameter	30"
Propeller pitch	15"
Propeller R.P.M.	608
Fuel tank	16 gallons
Cooling	radiator
Height above deck	48 3/4"
Width	36 1/4"
Weight (dry)	2780 lbs.

Hundreds of Harbormasters are in continuous marine use in many applications. Send today for Harbormaster Catalog containing specifications and over 70 photos and diagrams.



Harbormaster Outboard Propulsion and Steering Units are complete marine power packages, ready for immediate use. Everything is included . . . fuel tank, battery, steering mechanism, even the hold-down bolts. Mount; put in fuel; start; and you're off with exceptional power and maneuverability. Harbormasters give you special features not found with ordinary marine power. They are the outstanding and practical choice for jobs where you want an easily installed marine power unit you can depend on.

• **Steers instantly in any direction with full power**
Exclusive patented M&T 360° Propeller Thrust Steering Control gives you the ultimate in maneuverability.

• **Underwater parts easily accessible for maintenance or repair**

Special 180° elevating mechanism allows one-man operator to raise entire submerged assembly to any degree he desires. No dry docking or diving for repairs necessary.

• **Provides protection in shallow water**

Patented shear pin automatically shears off should underwater assembly strike a submerged obstacle. Assembly rides over obstacle, free from damage, without loss of forward motion or operating power. Pin easily replaced while under way.

• **Economical to operate and maintain**

You realize savings in fuel expense because you get more thrust per horsepower with outboard propulsion. Harbormasters give you rugged, dependable operation with a practical minimum of maintenance and service.

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Address.....

MURRAY & TREGURTHA, INC.
QUINCY 71, MASSACHUSETTS

New Company Formed



D. D. Cook

Daros American Corporation, of which D. D. Cook is president, has been formed to handle the exclusive sale of Daros piston rings throughout North, Central and South America. Daros rings are made by AB Davy Robertsons Maskinfabrik, Gothenburg, Sweden. These rings are made by one of the oldest piston ring manufacturers in the world (organized in 1851). They also have one of the largest factories devoted to making large-bore

piston rings. Their up-to-date foundry and manufacturing equipment is very modern.

Daros rings are made of world-famous Swedish Charcoal iron, noted for its long life because of its wear-resisting qualities. Daros has been successful in producing an anti-corrosive Swedish iron for piston rings and cylinder liners, which is establishing excellent records in diesels burning "heavy fuel." Daros makes all types and styles of piston rings—from as small as 1/2 in. to as large as 96 in. (8 feet) diameter. Their two-piece Duplex Sealing Rings (made with solid integral sealing lugs) are rendering good service in cylinder liners having as much as .008 in. to .010 in. wear or taper per inch of cylinder diameter.

It is stated that possibly over 50 percent of all the large diesel ships in the entire world, sailing the Seven Seas, operate with Daros piston rings. Mr. Cook states that prompt delivery—a substantial inventory of Daros piston rings in standard sizes for popular-make industrial diesels and dual-fuel and natural gas engines will be carried in their Chicago warehouse for immediate shipment. Delivery on all other sizes within four to six weeks from receipt of order.

Mr. Cook has been in the piston ring business for many years. He started in San Francisco in 1920, representing a piston ring manufacturer. He moved to Chicago in 1928 for the same manufacturer and then in 1930 he became associated with the C. Lee Cook Manufacturing Company at Louisville, Ken-

tucky, which company he has represented continuously up to the present time. As stated above, he now heads up the Daros American Corporation with offices at 1737 Howard Avenue, Chicago 26, Illinois.

Three Distributors Appointed

The Detroit Diesel Division of General Motors has announced the appointment of three new distributors in various parts of the nation.

The Service and Supply Division of Lake Shore Engineering Company of Iron Mountain, Michigan will serve the mining, logging and construction industries in Michigan's Upper Peninsula. The firm, in servicing that area for over 90 years, has established complete factory-approved sales and service facilities.

Min-A-Con Equipment Company of 1914 E. Buchanan St., Phoenix, Arizona will act as GM diesel distributors throughout that state. Heading the new company are L. W. Beck, H. H. Hall and C. C. Sons. Complete factory-approved sales and service have been established at the same address. The firm is also distributor for Euclid earth-moving equipment.

Rendering complete service to GM diesel owners throughout the state of Indiana will be the Reid-Holcomb Company with complete facilities at 1815 Kentucky Ave., Indianapolis. Sales engineers are located in principal cities of the state.

**HERE'S THE FOOLPROOF WAY
TO STOP Rust and
Corrosion**



**For All Diesels
Both on Land
and Afloat**

Cuts replacement and maintenance expense caused by cracked and corroded cylinder liners—corrosion fatigue due to pitting of liners on water cooled side. Controls scale deposit.

Used on trucks, buses, railroads, industrial power plants, refrigeration and ice plants, and air conditioning systems—wherever water is circulated. Will not build up scale or restrict water passages. Economical—only 1 oz. needed to each 10 gallons of water; no exact measuring required.

Quart \$3.90, Gallon \$12

If your marine dealer doesn't carry Liquid AQUA-CLEAR write for brochure and bulk prices today.

SUDBURY LABORATORY
Box 788, South Sudbury, Mass.

Sudbury Quality Marine Products

**LIQUID
AQUA-CLEAR
PROTECTS
MARINE
ENGINES**

20 years of use all over the world have proven that **Liquid AQUA-CLEAR** gives complete protection against rust and corrosion in closed cooling systems and heat exchangers of internal combustion engines.

Non-caustic Liquid AQUA-CLEAR cannot evaporate, never needs to be renewed unless the system is drained, gives complete protection with no adverse effect on all metals, piping, water pumps, hoses, etc.

DIESEL ENGINE CATALOG

The purpose of this little advertisement is to tell you about Volume 19 of **DIESEL ENGINE CATALOG** which is now available, entirely revised and rewritten. This is the 19th edition of the book that has earned the name of "the bible of the industry."

All smart diesel engine salesmen carry this book around in their car. When they run into some new competition with which they are not too familiar, the **DIESEL ENGINE CATALOG** gives them full, accurate information when they need it most.

The consulting engineer keeps this book in his reference file. It immediately gives him *all* data on diesel engines coming within a given horsepower range, speed range and weight range.

People who sell, people who buy, people who use diesel engines need this new, fully illustrated, up-to-the-minute volume. It has been completely revised and expanded. Orders are now being accepted for this latest edition. Price \$10.00 prepaid.

Add California Sales Tax for Delivery in That State

DIESEL PROGRESS
816 N. LA CIENEGA BLVD.
LOS ANGELES 46, CALIFORNIA

Mid-Continent Diesel News

By Jack F. Cozier

GEORGE PEPER, Mayes county rancher, has just purchased a D-4 Caterpillar tractor with a Caterpillar #42 tool-bar for sub-soiling. The unit was purchased from McCormick Machinery Co., Tulsa, Oklahoma.

ON DISPLAY at the recent Associated Motor Carriers of Oklahoma convention was an IH DTC-405-L truck tractor powered by a JT-700 Cummins turbo-charged diesel engine. The tractor was riding on Good Year 10.3 x 20 ply nylon tires.

CITY OF Hominy Oklahoma has in operation in their Municipal power plant a Cooper-Besemer JS-GDT (dual-fuel) gas engine. In a little over six years this engine has operated for 53,500 hours without inspecting a piston or bearing.

MID-STATES Construction Co., Tulsa, Oklahoma, has purchased a Unit 1020A back hoe powered by a GM 3-71 diesel engine. The hoe will be used for pipe line work and was purchased from Mid-Western Engine & Equipment Co., Tulsa, Oklahoma.

WEST TEXAS has received an 8-PC-2505 Buda gas pump for power pipeline usage.

TRANSCON LINES, Inc., Oklahoma City, Oklahoma, has put into operation an IH DTC-405-1 truck equipped with a Cummins JT-600 engine with the new PT fuel system.

KOON BOILER & Machine Co., Shidler, Oklahoma, just bought a Caterpillar D-6 tractor for oil field contracting work. The unit sold by McCormick Machinery Co., Tulsa, Oklahoma, was equipped with a 6-S dozer and a Hyster winch.

LEROI CO., Tulsa, Oklahoma factory branch, has just moved into their new 25,000 sq. ft. building at 5000 45th West Ave. The new modification and assembly building has in operation two 7½ ton Shephard-Niles cranes.

UNITED STATES Gypsum Co., Chicago, Illinois, has in operation a Mack LMSWM truck powered with a Cummins NHB1-600 for use at Southard, Oklahoma. The Cummins engine is equipped with the new PT fuel system.

A DRILLING rig in southern Oklahoma has just received two Buda 8MO-1290 gas engines from the Buda Engine & Equipment Co., Tulsa, Oklahoma.

CHARLES GREEN, Tulsa agricultural

contractor, has in operation a Caterpillar D-7 tractor sold by the McCormick Machinery Co., Tulsa, Oklahoma. This unit is equipped with a Caterpillar #25 cable control, a 7-S dozer and four Preco back-rippers.

CHEROKEE OKLAHOMA Municipal Light plant has just completed the installation of a Cooper-Besemer LS-6-GDTSG (three-way) engine to complement the LS-8-GDT Cooper-Besemer engine already on the job.

SINCLAIR Oil & Gas Co., Tulsa, Oklahoma, has purchased a Unit upper basic model 1520T powered with a GMC 471 diesel engine with a Unit torque converter. The unit will be used for barge mounting in Louisiana and was sold by Mid-Western Engine & Equipment Co., Tulsa, Oklahoma.

KERR-McGEE Uranium plant in New Mexico has just purchased another LeRoi L-4000 gas engine to fit in with two of the same units already on the job.

CO-OPERATIVE Farm Chemical Assoc., Lawrence, Kansas, has purchased two LS-8-GDTSG and two LSV-16-GDTSG Cooper-Besemer engines for operating a fertilizer plant. Each engine is attached direct driving a compressor frame.

COSMO Construction Co., Tulsa, Oklahoma, is powering a Euclid 14TDT self-loading scraper with a Cummins NHB1S-600 engine equipped with a new PT fuel system.

W. G. BURGESS, Tulsa, Oklahoma, has in operation three D-7 Caterpillar tractors sold by the McCormick Machinery Co., Tulsa, Oklahoma. These units are equipped with an undercutter, a Crossville v-shaped tree-cutter, Fleco rock rake, Fleco brush rake, #64 Caterpillar tool-bar, #25-Caterpillar cable control, and a Rome TAH 20-28 disc.

BUDA ENGINE & Equipment Co., Tulsa, Oklahoma, reports the sale of a Buda 8MO-1290 gas engine for a torque converter on a drilling rig in So. Okla.

CITY of Augusta Kansas municipal light plant has in operation two LS-8-GDT Cooper-Besemer dual-fuel engines, one for five years and one for four months.

HALLIBURTON Oil Well Cementing Co., Duncan, Oklahoma, has purchased an IH RFD-192 truck powered by a Cummins JBS-600 engine with the new PT fuel system. The unit will be used from the Oklahoma City office.



SAVE Fuel Injectors!

FRAM Water Separator & Fuel Filter ends corrosion, rusting, pitting with 100% water removal

Here's how FRAM's double-action Water Separator & Fuel Filter gives your fuel injectors complete protection:

- 1. 100% WATER REMOVAL** Removes all water before injection . . . saves costly injectors from corrosion, rusting and pitting!
- 2. TRAPS DIRT AND DUST** FRAM Filtration traps and removes dangerous dirt before it reaches injectors . . . ends abrasive action!

Save on injector replacements . . . cut downtime! Write for information on FRAM Water Separator & Fuel Filter today!

FRAM

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FILTERS

FRAM CORPORATION
Providence 16, R. I.
Fram Canada Ltd.
Stratford, Ont.

Gulf Coast Diesel Notes

By Michael T. Pate

THE United States Weather Bureau, Houston, has purchased through Waukesha Sales & Service, Inc., of Houston, two model 135DKU, 30 kw. ac. generating sets with Waukesha diesels, to fur-

nish auxiliary power for two weather stations in the Gulf Coast area of the state of Louisiana.

TRUETT & Cassells Lumber Company, Zavalla, Texas, has bought from Stewart & Stevenson Services, Inc., Houston, a model 71, six-cylinder General Motors diesel rated at 165 hp. The engine will power a sawmill.

KEMP & Tony, Baytown, Texas, have bought through Whites, Inc., of Houston, a model UD350 International Harvester industrial diesel rated 75 hp. at 1800 rpm.

PAN American Production Company, Houston, has bought a series 71, inclined General Motors diesel power unit equipped with hydraulic reversing and reduction gear with 1½:1 ratio. The diesel will power a crew boat being built for the company, and was sold by Stewart & Stevenson Services, Inc., Houston.

G. R. GANTT Towing Company, Houston, has bought two Onan generating units, model 3MDSP1R, delivering 3 kw. ac. and dc. current. The sale was made by Buda Engine & Equipment Co., Inc., of Houston, through Vector Mfg. Co. The units will provide auxiliary power on the company's towboat.

BURTON Shipyard, Port Arthur, Texas has bought through Stewart & Stevenson Services, Inc., Houston, two Stewart & Stevenson model MD20 ac. generators rated at 20 kw., which will furnish auxiliary and stand-by power for a crew boat being built for Western Shellfish Company. The units are powered by General Motors series 71, two-cylinder diesels rated at 34 hp.

EXPLORATION Equipment Company, Houston has purchased two Kohler 10 kw. generating sets from Waukesha Sales & Service, Inc. of Houston. The diesel units are destined to furnish auxiliary power on the marine equipment.

WINTERS, Texas, has bought through Fairbanks, Morse & Company, one model 38D8½ spark ignited gas engine for installation in their city power plant. The 1280 hp. engine was sold through the Houston office of Fairbanks, Morse & Company.

TOMLIN & Fleming, Silvertown, Texas, have bought a model 71, quad-six General Motors diesel to power their cotton gin at that city. The 520 hp. diesel will operate at 1600 rpm. Sale was made by Stewart & Stevenson Services, Inc., of Houston.

A. G. Boudreau, Sunset, Louisiana, has secured from Waukesha Sales & Service, Inc., Houston, a model 135DKB, 150 hp.

Waukesha diesel which will be used to repower a truck tractor.

BLUDWORTH Shipyard, Houston, has bought two General Motors diesels, series 71, to power a twin screw crew boat through 1:1 gear and hydraulic reversing gear. The craft is being built for the Tropical Steamship Company and will be used in its New Guinea service. Stewart & Stevenson Services, Inc., of Houston furnished the diesels.

LIGHTHOUSE, Inc., Houston, has bought through Buda Engine & Equipment Company, Houston, two BD77, 15 hp. diesels to bring their total of such units now to 32.

C. T. ROBERTSON, Wichita Falls, Texas, has bought a Stewart & Stevenson model 12GD175 ac. generating set. The unit will produce 175 kw. at 480 v. The unit is powered by a General Motors diesel, series 71, twin six.

T. DeVALCOURT, Sunset, Louisiana, has bought through Waukesha Sales & Service, Inc., Houston, a model 135DKB Waukesha diesel which he will use to repower a tractor.

GULF Oil Company, Pipe Line Division, Houston, has secured through Stewart & Stevenson Services, Inc., two General Motors diesels, series 71. These inclined four-cylinder diesel units will drive a twin screw crew boat through 1½:1 hydraulic reduction and reversing gears.

Receives Navy Order

Mr. Robert H. Morse, Jr., President, Fairbanks, Morse & Co., announced recently his company's receipt of an order for diesel engines to power four LST vessels for the United States Navy.

The order calls for twenty-four 12-cylinder Model 38D8½ diesel engines, including gears and couplings, and totals over four million dollars. "We are extremely pleased to receive this diesel contract," said Mr. Morse. "It is the largest diesel contract that has been issued by the Bureau of Ships since the end of World War II. The engines will be manufactured in our Beloit, Wisconsin Works."

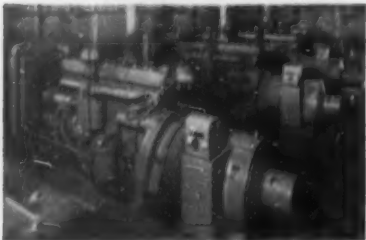
Assistant Development Engineer

The Trane Company, manufacturing engineers of heating, air conditioning, refrigeration and heat transfer equipment, announce the appointment of George P. Staats as assistant development engineer in the Engineering Department. Mr. Staats received his bachelor's degree in mechanical engineering from Cornell University in Ithaca, New York. He is an associate member of the American Society of Refrigerating Engineers.

He served for three years in the armed services during World War II as a Sergeant in the Corps of Engineers. During this time, he was given special training in photography—plotting contour maps from aerial photographs.

E-M "Packaged" Generator Bulletin

"ON-THE-SPOT" POWER WHEN YOU NEED IT



These "rest pocket" auxiliary power plants are operated by a large refining company. Such plants, comprising a diesel engine and a 100 kw E-M "Packaged" Generator, produce high-quality voltage right on the spot, for needs such as lighting, controls, communications, and even large pump motor starting and operation.

E-M "Packaged" Generators supply constant voltage automatically...dependably

● Simple, trouble-free, and dependable...these E-M "packaged" units are complete. Generator, exciter, control, and all necessary components are integrated into one compact housing, ready to install and easy to connect. And no special switchboards or operating skills required!

Built-in voltage regulators assure a steady output whether generators are operated singly or in parallel. When load varies, voltage output is quickly returned to desired level.



Form S "Packaged" Generator by E-M, with direct-connected exciter. Factory assembled. Many other types available to fit desired engine design.

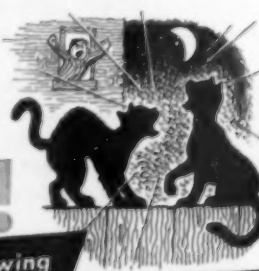
Sturdy E-M construction plus a minimum of moving parts gives you long service with only routine maintenance. Ratings to 187 kva, in speeds of 900 to 1800 rpm. Ask your nearest E-M sales engineer for more facts, and write for publications listed below.

ELECTRIC MACHINERY MFG. CO.
MINNEAPOLIS 13, MINNESOTA

Send for these informative brochures:

- ☐ "The A-B-C's of 'Packaged' Generators"
- ☐ E-M Synchronizer No. 33, Generator Issue (2100-TPA-2147)

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— at the cat, but we can assure you they will throw your annoying, costly and unnecessary intake and exhaust noises for a loss. Burgess-Manning Snubbers are designed to silence noise from air, steam and other gases being discharged into the atmosphere, or air intake of engines, compressors, blowers, etc. These noises can be very costly to you in disrupted and incorrect oral communications, jittery personnel, poor neighbor relations, and even in compensation claims for impaired hearing. Burgess-Manning Snubbers are engineered to your needs.



Tell us your problem — let us recommend



BURGESS-MANNING COMPANY

Southern Division 747 East Park Avenue, Libertyville, Illinois

Crowd Expected at A.E.D. Convention

Registrations for the 36th Annual Meeting of Associated Equipment Distributors, to be held at the Conrad Hilton Hotel in Chicago, Jan. 23-27, 1955, are rapidly approaching the record-breaking total of last year's convention, according to A.E.D. Convention Chairman Cornelius Whetstone, Service Supply Corp., Philadelphia, Penna. With the Annual Meeting still more than two months away, nearly 2,000 reservations have poured into A.E.D.'s headquarters. This figure, running equal to advance registrations at this time last year includes representatives from 347 manufacturer members and 414 distributor members of the association. Actual attendance is expected to exceed last year's record-breaking total of 2,500.

The five-day business and social program, which officially gets under way Monday, Jan. 24, will be preceded on Sunday by two major events. An annual convention feature, the "Meet Your Manufacturer" session where individual distributors confer with manufacturer's top executives, is slated for Sunday afternoon. With increased floor space available this year, the event is expected to smash all previous attendance records. Adding to Sunday activities, officers from local distributor associations will attend a clinic designed to aid them plan 1955 activities.

A.E.D.'s recently-initiated Industry Round Table, where a cross-section of distributors and manufacturers air mutual problems, will spotlight intra-industry relations at Tuesday's business meeting. The afternoon will be free for distributor-manufacturer conferences. Tuesday evening is reserved for the convention's most popular social event—A.E.D.'s Annual Birthday Party, celebrating the association's thirty-sixth anniversary.

A.E.D. distributor members will pick the Association's 1955 officers Wednesday morning. Following the election, all delegates will assemble for an important presentation on sales planning. Prepared under the direction of A.E.D. by a management consultant firm, the planning program was developed from comprehensive field studies and is expected to be of considerable aid to all members. The Association's newly-elected officers will take over the reins of A.E.D. at the colorful Installation Luncheon, scheduled for Wednesday noon. The remainder of the day will be devoted to more distributor-manufacturer parleys and small group discussions on advertising. Manufacturer-distributor selling practices will be examined and discussed at the final business session on Thursday. In addition to Chairman Cornelius

Whetstone, the A.E.D. Convention Committee is composed of W. A. Patterson, Richards Equipment Co., Waco, Tex.; R. F. Newlin, Newlin Machinery Co., Kansas City, Kan.; S. G. Marks, Marks Tractor & Equipment Co., Cleveland, Ohio; and A. F. Sersanous, Loggers & Contractors Machinery Co., of Portland, Oregon.

Oil and Gas Power Division, ASME, Conference

Attendance at the annual conference of the Oil & Gas Power Division of the ASME, June 6 to 9, in Washington, D. C., may reach as high as 800 persons, according to John A. Worthington, chairman of the division's executive committee. Since exhibit space at the Statler Hotel will be limited to about 55 booths, Mr. Worthington urges all suppliers desiring space to make reservations at once. Last year, at Kansas City, there was a capacity number of 44 exhibitors. Practically all have renewed their reservations, leaving few openings. Requests for space or information should be sent to Mr. Worthington, P.O. Box 626, Baltimore, Md.

Two major convention committee chairmen have accepted appointments since those mentioned in the December issue of DIESEL PROGRESS. They are: P. B. Jackson, Aluminum Company of America, Cleveland, Meetings & Papers; and Ray Schakel, Diamond Chain Co., Indianapolis, Exhibits.

Three panel discussions are planned. One, on specifications by the General Technical Committee, is being arranged by J. C. Barnaby, Worthington Corp., Harrison, N. J. Captain W. Clay Latrobe will be chairman of another panel on the burning of heavy fuel. The third will concern standardization of diesel engines, with Captain William A. Dolan, Bureau of Ships, as chairman. The theme of the convention will be "Oil and Gas Power for National Defense."

Hydrostatic Tester

A new hydrostatic tester for use on the cylinder heads of Cummins H and NH series engines has been announced by B. K. Sweeney Mfg. Co., Denver 17, Colorado. Made of aluminum alloy, the new tester weighs less than 34 lbs. and is designed for either floor, bench or wall mounting. The unit provides a fast, practical means of testing cylinder heads for leaks, before the head is mounted on the engine. Rubber grommets located on the revolving cradle of the tester support the cylinder head and seal-off the water or air or a combination of water and air holes on the bottom of the head. Water is supplied to the head through an injector spider which mounts over the two

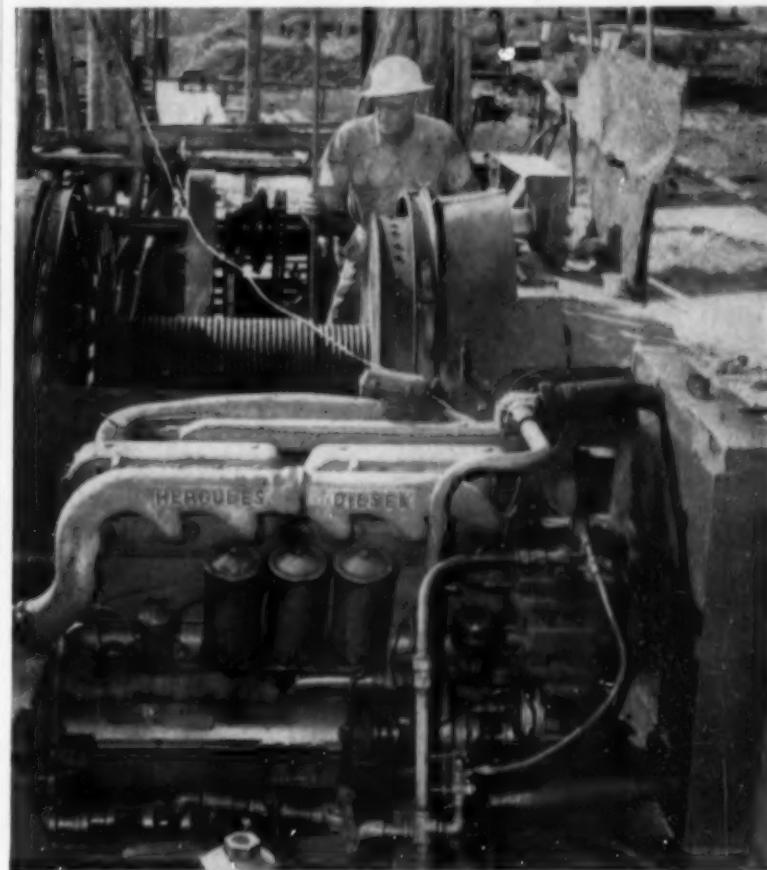
water header holes on the top of the head. All points of contact are held in firm position by a one-motion cam lock. A similar tester is being prepared for use on the cylinder heads of General Motors Series 71 engines.

Moves to New Quarters

Shelley Tractor & Equipment Co. has moved to their new and modern build-

ing at 313 Margaret Street, Key West. The firm, distributors of Caterpillar diesel equipment, opened their first parts and service branch in Key West in April 1951 shortly after the discovery of the fabulous shrimp beds near Dry Tortugas. With the expanded facilities Shelley Tractor & Equipment Co. will be able to give better service to the shrimp fleet berthed at Key West, which number between 250 and 300 vessels.

Case History of Dependable Service



"No Shutdown in 2 Years!"

This Hercules Diesel Engine Model DFKE has operated for over two years without time-out for engine repairs, by the K. B. Knox Drilling Co. The master mechanic took great pride in explaining to us the operating record of this engine and its economy during 24 months of "trouble free" service.

This is just an example of the dependable service which is "built-in" all Hercules Diesel Engines. Of course, good maintenance is important in the operation of any engine but the engineering and manufacturing "know-how" of Hercules Motors Corporation is an important first step for any operator to consider.

Hercules has been building engines since 1915. Some of those first engines are still working for their owners. For similar dependable service it will pay to investigate the use of Hercules Diesel Engines in your equipment. Our engineers will be happy to work with you in solving your diesel power problems.

Engine Manufacturing Specialists Since 1915



HERCULES ENGINES

HERCULES MOTORS CORPORATION

127 Eleventh Street, S. E. • Canton, Ohio

Inland River Reports

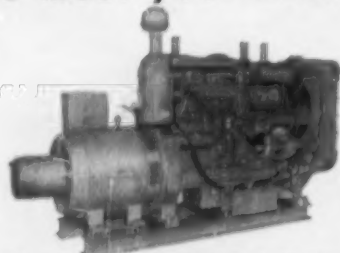
By David I. Day

WITH THE upper Mississippi River dams closing Dec. 6, there will be many boats making appearance on the lower

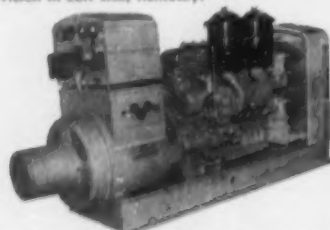
KATO

Continuous **A.C.** Standby Power
GENERATORS
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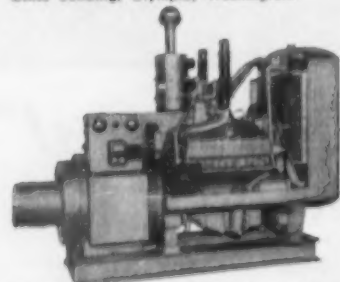
... a size and type to meet your needs



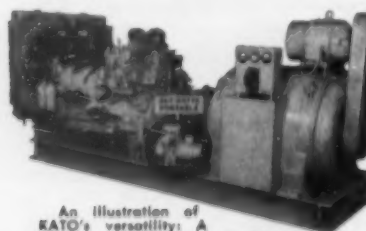
Above photo shows a 90 KW, 62.5 KVA, 1200 rpm, 120/208 volts, 3 phase, 60 cycle KATO Generator and instrument panel, driven by an International Model UD-18A diesel engine. Installed for the Mechanical Construction Division in Salt Lake, Kentucky.



This is a 90 KW, 62.5 KVA, 1200 rpm, 120/208 volts, 3 phase, 60 cycle KATO Generator and instrument panel, driven by a General Motors 6030C diesel engine. Installed in the State Office Building, Olympia, Washington.



This picture is a 75 KW, 53.5 KVA, 1800 rpm, 240 volts, 3 phase, 60 cycle KATO Generator and instrument panel, driven by an H-540 Le-Bal engine utilizing natural gas for fuel. Installed for Republic Steel Corporation of Gary, Indiana.



An illustration of KATO's versatility: A 350 watt KATO Generator driven by a Lauson LHM engine and a 150 KW, 187.5 KVA, 750 rpm, 120/208 volts, 3 phase, 25 cycle KATO Generator and instrument panel driven by a General Motors twin 6-71 diesel engine. For Duluth, Mesabi & Iron Range Railway.

Your inquiries invited.

Builders of Fine Electrical Machinery Since 1928

KATO Engineering Company

1443 First Avenue, Mankato, Minnesota

Miss. and the Ohio. Some of them are used permanently on warmer water. An example is the celebrated *A. M. Thompson* of the Mississippi Valley Barge Line. This 2600 hp. Enterprise engined wonder, Calumet-built, went to the Ohio one winter and has been there ever since.

THE *Tri-State* of the Ashland Oil fleet made a surprise trip up the Mississippi recently and the crew are loud in praise of the scenery there. She gets 2000 hp. from her twin Superiors. She came from Calumet yards in 1942. We are told that Engineers Vincent Davis and Jack Cornette are well pleased with the *Tri-State's* engine room.

THE NEW *A. H. Crane* of the Ohio River Company has the honor of being the first boat to bring coal to the giant Kyger Creek power plant of the Ohio Valley Electric Co. The tow consisted of 16 barges, heavily loaded, and much photographed as she passed upper Ohio River ports. The *Crane* has engineers John Russell and Chuck Frazier in charge of her 2100-hp. Baldwin diesel engines.

JOE MASON writes from New Orleans of a big tow of 12 barges of petroleum products brought up the Mississippi by the *Peace* of the Union Barge Line. Our compliments to this boat built by Dravo 20 years ago. She has twin G-M engines, 1500 hp.

MOTT LEE and Carroll Patterson are reported doing a fine job in the engine room of the *Island Creek* of the Island Creek Fuel & Transportation Co., built at Sturgeon Bay yards in 1953. She uses twin G-M engines, 1800 hp.

OUR THANKS to Joe Mason, H. L. King, and Mrs. Winona Edmundson for information by phone this month on boats noted in southern waters. We were glad to hear that the *Harry Truman* of Federal Barge is still maintaining her reputation as one of the best and fastest towboats. The good engineers, I. L. Honey and Will Cummings, are in charge of the G-M twins, 3600 hp.

WE LEARNED also that the *Betty Sue* of the M & M Towing Co., Greenville, Miss., has been on work trips up the Illinois River. Her power comes, 800 hp., from twin Caterpillars. Nice little boat with two excellent engineers, Earl Carpenter and Cotton McKinney.

IT WAS A THRILL to hear of recent fine towing by the *Rebel Warrior* on the lower Miss. This boat with twin Cummins engines, 1800 hp., is one of the most dependable on the waterways. Our best wishes to the owners, Black Warrior Towing Co.

A GOOD BOAT we've seen little of for some reason is the *Susan Hougland*, built at Nashville Bridge five years ago, 117 x 31 by 11 approximately has 3000 hp., from twin General Motors diesels. We had a good look at her one recent bright day as she came through the locks at Newburgh, Ind. Her tow consisted of six barges of coal for Mount Vernon plus an integrated number of empty gasoline barges.

THE *Jeffboat*, 3200 hp. Fairbanks-Morse twins, a rare worker for the American Barge Line was mentioned in more recent mail than any other pushers. We saw her just before writing this report —on the upper Ohio pushing a long tow —largely steel consignment, Capt. Walter Canter at the controls.

MRS. MABEL Dellinger wrote from her home below Pittsburgh: "The first of the boats to leave the ice around St. Paul and pull by here is the good *Northern* of the Valley Line. You will recall she was built at the Walker Yards, Pascagoula, Miss. A Fairbanks-Morse work boat she is now being commanded by the well-known Capt. A. J. Trosclair."

WE HAVE A picture of the *Franklin D. Roosevelt* taken at Kansas City by Greeley Emmons, there from Chicago on business. It was on the recent occasion of her final trip for a while to KC—pushing a tow of steel goods and burlap. Its McIntosh & Seymour engines have created interest in a revitalized Missouri River traffic.

NICE COMPLIMENTS were paid in a recent letter to Gordon Henderson and John Burgess, engineers on the *Frances Anne* of the Upper Mississippi Towing Co. "Every time the boat passes Greenville locality she is making nice time and is handling nicely. Henderson and Burgess both know how to get work of high grade out of the boat's twin Fairbanks-Morse engines."

WORKING WITH the *Frances Anne* on the lower part of the Mississippi River is the Mount Vernon, a product of the Jeffersonville Boat & Machine Co. The Mount Vernon uses triplet Cooper-Bessemer engines. We heard recently that the engineers were Clarence Snyder and Charles Hooper.

CONGRATULATIONS to H. D. Coriell, Portsmouth, O., reported as the new chief engineer on the *Sohio State*. And best wishes to Charles J. Dassing of Cairo, Ill. who had the job until his recent retirement. Under many names—*Edgar C. Johnston*, *Sohio Memphis*, and *Sohio State* the boat has been popular. She is a 650-hp. boat using twin Superior diesels.

THE *Casteel*, 3600 hp. Fairbanks-Morse twins, is now owned by the Oil Transport Co., and is to be renamed the *Bayou Lacombe*.

Catalog

Inside and out features of the Allis-Chalmers HD-9 dieselized crawler tractor are shown in a three-page cut-away view which highlights illustrative material in a new catalog now available from the Tractor Division, Allis-Chalmers Manufacturing Company. The catalog's 30 pages also contain many other illustrations which help tell the engineering, mechanical and operating story of the HD-9. A group of on-the-job photos tie the tractor's versatility and performance ability to the operator's job requirements. Allied equipment and special accessories matched to the HD-9 for maximum operating efficiency by the unit, are also pictured.



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Florida Diesel News

By Ed Dennis

AT FORT LAUDERDALE, the Inter-county Construction Co. took delivery of a Hough Payloader model HM powered with a Hercules 86 hp. diesel and an Allison torque converter from Florida-Georgia Tractor Co.

GENERAL ENGINE & Equipment Co. Tampa, supplied the model 4-51 General Motors diesels for the new vessel owned by Dixie Kuhr of Sanford. Paragon gears were also used on this twin screw vessel.

WAUCHULA POWER plant will add another diesel, a Fairbanks-Morse opposed piston type engine rated at 1280 hp. along with a Fairbanks-Morse generator.

ELLIS DIESEL Sales & Service has been appointed authorized dealer in the marine division for the Onan diesel power units in the Fort Lauderdale area.

THE ORLANDO Live Stock Farms received a DW 21 Caterpillar tractor powered with a model D357 Caterpillar diesel rated at 225 hp. from Rozier Equipment Co. of Tampa.

FOR COASTAL towing, the tug *Jewel B* owned by Belcher Oil Co. was repowered with a model 6-110 General Motors diesel and G. M. hydraulic controls.

CUMMINS DIESEL Engines of Fla. installed a HB 600, 200 hp., in an Auto-car tractor for Earl Koger also a model JBS rated at 150 hp. at 2500 rpm. in a GMC tractor for L. B. Wingate of Tampa.

AT KEY WEST, the 72 ft. trawler *Danil* was built and launched by Capt. Oscar Ramirez. The D357 Caterpillar diesel and Snow Nabstedt r&r gears were furnished by Shelley Tractor & Equipment Co., Miami.

FLORIDA-GEORGIA Tractor Co. delivered to Dade County a Galion road grader with a UD 16 International Harvester diesel plus a Galion road roller powered with a UD 350 International Harvester diesel engine.

The *Bonheur II* a 53 ft. yacht owned by Harry Bush of Fort Lauderdale, a pair of General Motors 6-71's rated at 160 hp. each with G. M. 2:1 hydraulic r&r gears, from Ellis Diesel Sales and Service.

AT MIAMI, Finley-Smith took delivery of an Allis-Chalmers road scraper powered with HRBI-600 Cummins diesel engine and the new PT fuel system was installed on a model LRI 600 in a Bucyrus-Erie 88 B crane by Cummins Diesel Engines of Fla.

Soo Line Entirely Dieselized

By the end of January, 1955, when delivery of 59 diesels now on order is expected to be completed, the Minneapolis, St. Paul and Sault Ste. Marie Railroad (Soo Line) will be entirely dieselized. Twenty-five of the new diesels are for the Wisconsin Central Railway division of the system and 34 are destined for the original divisions of the railroad. The system will have a total of 201 diesel locomotive units.

The 59 units are being manufactured by the Electro-Motive Division of General Motors, American Locomotive Company and Fairbanks-Morse Company.

50th Anniversary Issue

The technical future of the motor vehicle and aeronautic industries will be predicted in articles by 12 distinguished engineers in the Golden Anniversary Issue of SAE Journal. Published in February, 1955, this commemorative issue celebrates 50 years of service by the Society of Automotive Engineers, which was founded in 1905. William Littlewood, vice-president in charge of engineering, American Airlines, Inc., and 1954 president of SAE, will tell the story of airline potentials in the jet age. "What Lies Ahead For Diesel Engines" will be discussed by C. G. A. Rosen of Caterpillar Tractor Co. He'll be the Society's president for 1955.

Orders 12 Road Tractors

Twelve more White 200 horsepower diesel tractors have been ordered by Super Service Motor Freight Co., Inc., it was announced by R. M. Crichton, president of the firm. This tractor with the 96-inch dimension from front of bumper to back of cab has been making an outstanding record for the past few months in highway service for the company. Super Service already has 140 of these in service.

This White Tractor with the Cummins diesel engine mounted at a 20° angle, originally went into road service for Super Service starting about six months ago and was engineered by White to meet this operator's exact highway needs. The 96-inch dimension permits use of 35-foot "high-cube" square-nose trailers and combined with various weight savings and use of aluminum and other light metals provide substantial payload advantages. Another advantage important to Super Service was the improved riding ease and driver comfort.

Unique Laboratory

A unique cooling tower laboratory operated by J. F. Pritchard & Company outside Independence, Mo. is searching for the magic equation of cooling tower de-

sign. Engineers at the laboratory hope, after experiments are ended, to be able to evolve an equation which will enable them to predict the performance of cooling tower decking without actual testing. The immediate objective is to measure cooling tower performance, using countless arrangements and construction types of cooling tower materials and to determine the performance characteristics of different types of deck filling. Pritchard engineers are determining how well the various types of decking cool water; air pressure through the decking; how much wood is required; how simple the decking is to fabricate and how easy it is to install and remove. A tower 50 ft. high and 6 ft. square is used for the experiments.

Pritchard research engineers recognize that the goal of these experiments is a difficult and elusive one. But, one thing is certain—the continuous experiments will inevitably result in improved, more economical design for cooling towers.

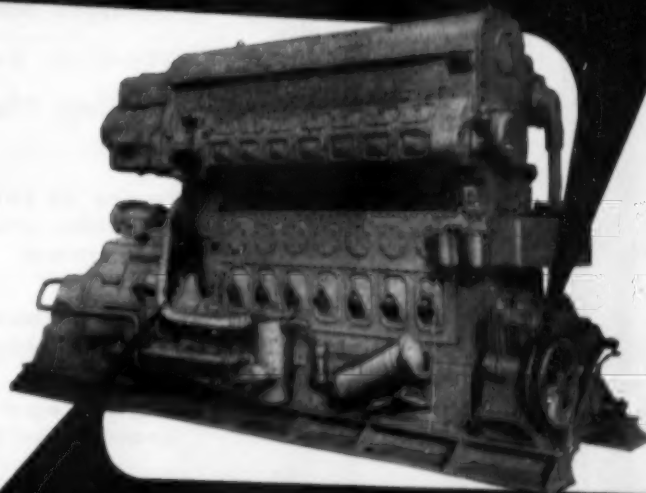
Increases Production

Purolator Products, Inc., of Rahway, N. J., one of the pioneer manufacturers of oil filters and other types of filtration equipment, increases production in January, 1955, when a new factory will be opened up at Allentown, Pa. Purolator's new plant was made possible through the purchase of the former Heilman Boiler Works plant and equipment on Linden Street in Allentown. It gives Purolator 40,000 square feet.

Cleveland Diesel Equipped Tug

A new tugboat, equipped with a Cleveland diesel 6-cylinder, 278-A, 600 horsepower engine, was launched in Oyster Bay, New York, recently. The tug, built by Jakobsen Shipyard, Inc., is scheduled to go into operation towing logs on the Intercoastal Waterway for International Paper Company, Georgetown, South Carolina. The tug was designed by Merritt Demarest.

Quincy FOR DEPENDABLE STARTING



on this FAIRBANKS MORSE DIESEL

Fairbanks Morse & Co. selected a Quincy Compressor to supply compressed air for starting this new apposed piston diesel. Like other leading diesel engine manufacturers, Fairbanks Morse used a Quincy because it gives long life and trouble-free service.

Specify a Quincy Compressor for your next diesel starting job. Compact, rugged Quincy Compressors will give you a dependable air supply.

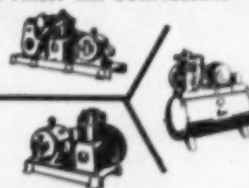


There's a Quincy Compressor for every job. Let us help you select the right model from a variety of mountings and sizes from 1 to 90 C.F.M.

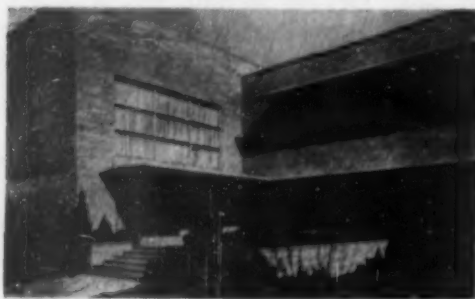
Write Dept. K-41, Quincy Compressor Co., Quincy, Illinois, for catalog on Quincy Compressors for diesel starting.

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QUINCY COMPRESSOR CO.
QUINCY, ILLINOIS



Open House of New Pritchard Building



J. F. Pritchard & Company, engineers, constructors and manufacturers, held open house for the business leaders of Kansas City and out of town guests,

Friday, December 3, 1954, in their new, modern general office structure at 4625 Roanoke Parkway. Incorporating approximately 46,000 square feet of floor space, including basement, it contains executive offices, a large drafting room, a conference room, library and modern private offices.

J. F. Pritchard & Company, J. F. Pritchard, president, was organized in Kansas City in 1920, and through the years has become one of the nation's leading firms of engineers and constructors for the petroleum, gas, chemical and power industries. The company's operations extends from coast to coast, and includes many foreign countries. In addition, a subsidiary company, the J. F. Pritchard & Company of California is one of the nation's principal

manufacturers of industrial and air conditioning cooling towers, air-cooled heat exchangers, and other specialized gas and air treating equipment.

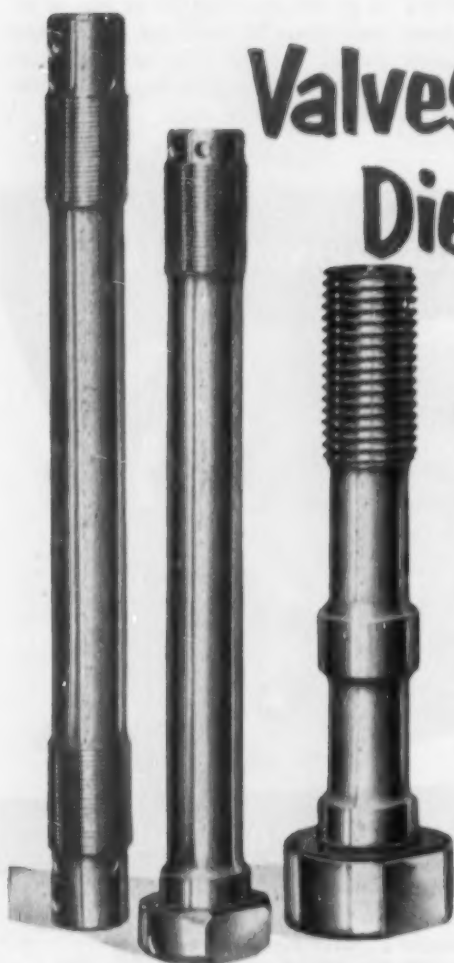
The firm has, in addition to its four senior divisions, one junior division devoted to the planning and construction of aircraft refueling systems for municipal and governmental airports. A wholly owned subsidiary, the Municipal Service Company specializes in sewage and water treatment plants.

Apart from its Kansas City general offices, Pritchard has district sales offices in New York, Pittsburgh, Chicago, St. Louis, Tulsa, and Houston. A branch engineering office is located in New Orleans. The Pritchard redwood fabrication plant, which manufactures component parts of cooling towers, is located at Merced, California. Edward W. Tanner and Associates, Architects, designed the new building in Kansas City.

Eaton Valves and Bolts for Diesel Engines

**Reflect the Experience of
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Giant Portable Generating Set



Portable electric generating equipment suitable for meeting emergencies created by destructive natural forces or enemy attack was demonstrated recently to high officers of the various military and civilian branches of the government. The demonstration was made at the Engineer Research and Development Laboratories of the U. S. Army Corps of Engineers, Ft. Belvoir, Va., by officials of Electro-Motive Division of General Motors. (See pages 21-24, DIESEL PROGRESS, November 1954, for pictures, charts and descriptions of this EMD equipment.)

Two versions of the mobile electric plant were shown—in a railway car and in a highway trailer. N. C. Dezendorf, vice president of General Motors and general manager of Electro-Motive Division, said these plants developed out of his company's experience in producing some 16,000 diesel-electric locomotives since 1934. The railroad version is made in capacities of 750 and 1000 kw., the highway version in 350 and 500 kw. sizes. The units can be quickly coupled together to provide any desired output.

Government officials, responsible for welfare of the nation's populace in cases of catastrophe, were shown how fleets of the units could be moved quickly into stricken areas. Within a few hours they could restore sufficient electric service to care for vital needs. Unusual features of control also were exhibited. These included methods of starting and stopping the units by radio, or by merely dialing a telephone. Control thus can be established from hundreds of miles away.

Coupling Saves Fueling Time

The Monongahela Railway cuts down refueling time for diesel locomotives and removes the hazard from fuel leakage by using on its fuel lines a coupling of special design produced by Titeflex, Inc., Springfield, Mass. Pulling back the sleeve on the coupling body, as the operator photographed is doing with his left hand, permits the coupling body to slip over the nipple on the end of the locomotive's fuel intake pipe. Releasing the spring-loaded sleeve locks the coupling onto the nipple and forms a leak-proof seal which becomes tighter as the fluid pressure increases.



To disconnect the fuel line, the coupling sleeve is pulled backward which permits the coupling body to be slipped off the nipple. Thus, connecting and disconnecting the fuel line to the locomotive is a one-two operation which can be done quickly by one man, in contrast to the time-consuming job this used to be when the conventional screw-on type coupling were used.

Besides the time-saving in connecting and disconnecting of the line, and the freedom from leakage, this coupling also has the feature of prolonging the hose life, since it avoids hose twisting. This non-twisting feature is achieved because the coupling is so designed that when the fuel line is connected, the coupling body can swivel freely around the end of the intake pipe.

The couplings are made in several types for different methods of hose attachment—the female pipe thread, male pipe thread, expansion ring, or barb shank type. All these types are interchangeable in the same size, providing great versatility in application of the coupling to different lines. To provide long service life, all bearing surfaces in the coupling are heat-treated and ball bearings and springs are made of stainless steel.

Hydrostatic Tank Gauge



A simple inexpensive easy-to-install dial type hydrostatic gauge is now available to the marine trade. This gauge features an easy-to-read dial graduated in inches and is made in two sizes to cover any tank up to 36 in. high. It features a special combination and lens cover that is so constructed that the zero position of the pointer

can be checked and reset, if necessary, without the necessity of opening the gauge or adjusting any of the gauge's mechanism.

It is especially adaptable for use on diesel oil day tanks, water tanks or other small tanks aboard ship. The Model "I" is built for bulkhead mounting and incorporates a built-in manual pump. The same gauge can be furnished for automatic operation for larger vessels or where an owner does not desire the manual pump. This same company can also furnish a similar gauge for panel mounting where it is desired to locate the dial indicator on a panel. This gauge likewise can be furnished for either manual or automatic operation and consumes no power from the battery.

Rectangular Diesel Air Cleaner Solves Tight Fit Problem

Problem: United Specialties was confronted with the problem of designing a diesel oil bath air cleaner which could be fitted into limited under-the-hood space.

Solution: United engineers departed from the conventional round shape and designed a new rectangular air cleaner which was shaped to fit into the available space, providing more room for accessories. This new cleaner with instantly removable dual filters is available in the following sizes:

5 3/4 x 9 1/2 for an air capacity of 175 cfm
6 1/2 x 11 for an air capacity of 240 cfm
7 1/2 x 12 1/4 for an air capacity of 300 cfm
8 3/4 x 14 for an air capacity of 400 cfm
10 x 16 for an air capacity of 525 cfm
11 1/2 x 19 1/2 for an air capacity of 740 cfm

Here is another example of how United Specialties engineers helped solve a tough design problem. We invite your inquiry.

Air Cleaners • Metal Stampings

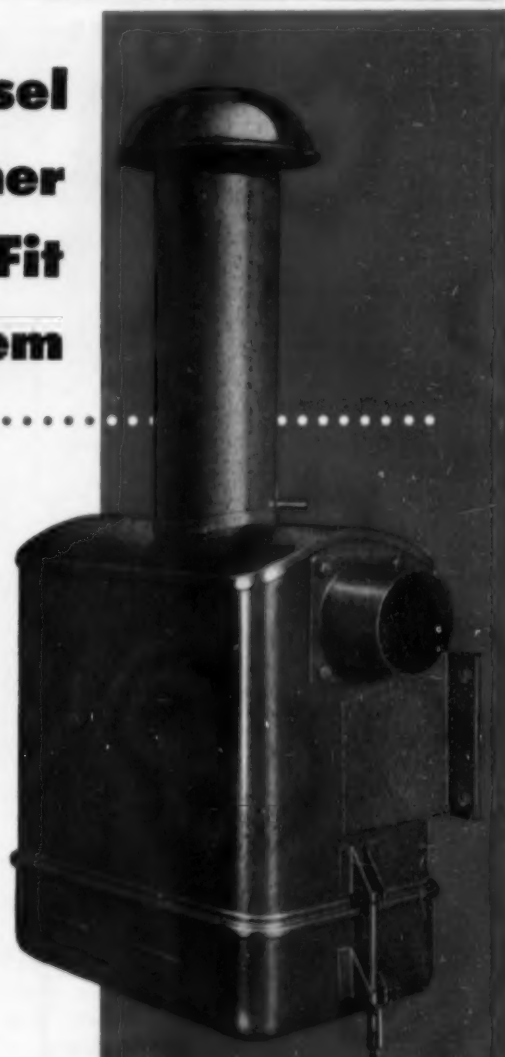
Rolled Shapes • Ignition Switches

Turn Signal Switches • Dovetails

The only thing required at the tank is an airbell consisting of a suitable length of tubing or pipe within the tank and regular plumbing fittings. This airbell is connected with the indicator by flexible tubing. The indicator can be located any place aboard ship where it can be easily read. Further information can be obtained from the Liquid-vision Gauge & Control Corp., P.O. Box 51, Ocean-side, Long Island, New York.

REA Managers Meeting

The annual REA managers meeting this year will be held May 2-6 at the Shirley-Savoy Hotel, Denver, Colorado. Harry F. Collins of Pittsfield, Illinois is the conference chairman.



United Specialties Company

United Air Cleaner Division
Chicago 28, Illinois
Mitchell Division
Philadelphia 36, Pa.
Birmingham 11, Alabama

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FOR ANY TYPE
OF FUEL INJECTION PUMPS
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"Toy to Titan"

"The saga of the piston . . . or 274 years from toy to titan" is the lead article in the new "Production Road" magazine, just released by Twin Disc Clutch Company, Racine, Wisc., a leading manufacturer of friction and fluid drives for powered industrial equipment. The article covers the full sweep of internal combustion engine development, from the Huygen engine of 1680 up to the powerful gas and diesel engines of today. Other articles in the new issue cover recent developments in powered equipment for the construction, oilfield, manufacturing and marine industries. Graphic reasons why fluid drives take the shocks out of industry, both mechanical and financial, are also given. A copy of the new issue of "Production Road" may be obtained by writing Twin Disc Clutch Company, Racine, Wisconsin.

High Efficiency Filter Media



A new type filter media has been developed by The Briggs Filtration Company of Washington, D. C. It has found a ready acceptance among transportation and industrial organizations as well as in the private car automotive field. This new material is being nationally marketed in filter cartridge form, made up to fit in almost any commonly used filter case, under the trade name of "Hyper-Kleen". It embodies all of the low cost features of cotton waste, but differs markedly in almost all respects from it with the exception of the important low cost feature. Oil and filtration engineers have always recognized the many advantages and disadvantages of cotton waste, and used it largely because of its low cost. Now such serious defects as packing down, channeling and dangerous unloading have been reduced to an almost negligible degree through the use of the Hyper-Kleen media, 75% of which is composed of high grade, specially selected cotton threads.

Physically Hyper-Kleen withstands over twice the pressure of packed cotton waste before any indication of unloading or channeling is noted. The amount of dirt retained by Hyper-Kleen was far in excess of packed cotton waste. Chemically, the combination of cotton threads and wool is inert and, therefore, will not affect detergents found in any lube oil. The active filter life of Hyper-Kleen is considerably longer than that of high grade cotton alone. For further information write The Briggs Filtration Company, River Road, Washington 16, D. C.

Brown Boveri Appointment



Dr. Ledo R. Carletti
Brown Boveri Corporation of New York announces the appointment to its staff of Dr. Ledo R. Carletti, who will be in charge of all consultation on super-charging of diesel and gas engines. Holding an MS degree from the Technical University of Zurich for his paper on the application of turbo jets on passenger planes, Dr. Carletti secured his doctorate from the same university for his research thesis on the influence of viscosity on shock waves in fuel pipes. Simultaneously, he was employed as a research engineer on diesel pumps at the Scintilla Works in Switzerland.

After securing his Ph.D., he joined the parent organization of Brown Boveri in its Baden plant as a member of the turbo-charging department. Here he was a development engineer especially concerned with large 2-cycle ship diesels. He came to the United States at the end of 1953 to join the Worthington Pump and Machinery Corporation in Buffalo where he was consulting engineer on super-charging of gas engines. In June, 1954, he assumed his present duties at Brown Boveri Corporation in its New York offices where his diesel engine background is employed for consultation on super-charging problems.

Western Kansas Distributor Named



W. R. Bays

W. R. Bays, former Kansas sales representative of the Detroit Diesel Engine Division of General Motors, has been appointed distributor for GM diesels in western Kansas. He has taken over facilities of Detroit Diesel's former distributor, the Diesel Equipment Co. of Wichita and Great Bend, and will continue the business in those cities under the same firm name.

C. J. Davy, previously sales representative for Detroit Diesel in a southeastern zone, temporarily will handle the zone sales representative's assignment in this area. Mr. Bays, president of the new company, has announced the following appointments: William Bennett, general manager; William Daniels, sales manager; Robert Abbott, service manager; and C. W. Hamilton, parts manager, all of whom were employees of the former distributor. J. D. Jarvis, who formerly operated the Diesel Equipment Co., will devote full time to his manufacturing interests.

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Complete facilities for grinding, plating, Magnafluxing, and electrically-controlled heat treating. Largest hard-chrome plating plant in the Mid-Continent area. Experience • Quality • Precision

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New Orleans Diesel News

By James W. Calvert

OVER 200 diesel men attended a fuel injection clinic in New Orleans recently, conducted by service engineer Henry Ortnier Jr. and sales representative Robert J. FitzGibbons of the American Bosch Division of the American Bosch ARMA Corporation. Sponsoring the clinic were John M. Walton, Inc., central distributor in New Orleans; Gerhardt's, Inc., service distributor, New Orleans; Womack Brothers Diesel Service, Baton Rouge, La.

EQUITABLE EQUIPMENT Company, New Orleans, delivered two 45-ft. tugs to Construction Aggregates Corporation of Chicago, for use in Lake Maracibo of Venezuela. The tugs were loaded as deck cargo aboard the *SS Polaris* and the *SS Republic of Venezuela*. They are single screw vessels, powered with GM series 110 diesel engines.

NEARING completion in the Madisonville shipyard of Equitable Equipment Co. is the third ocean going self-propelled cement barge to be built for Halliburton Oil Well Cementing Co. for use in the offshore oil fields of the Gulf of Mexico. Like her sisterships, Halliburton 208 is 122 ft. in length and is equipped with facilities for mixing cement while enroute to a location. The vessel is powered with twin Caterpillar D275 diesel engines.

SOLD TO Marine Construction Company of Patterson, La. were one 3 kw model 45 Fairbanks, Morse diesel generating units for installation in the vessel *Biscayne*.

A TEXAS Company pile driver barge has just been repowered with Caterpillar diesel equipment by Boyce-Harvey Machinery, Inc. of New Orleans. The equipment consists of a model D8800 air compressor, rated at 82 hp. continuous; a model D318 with Twin Disc torque converter, and two D311 electric sets of 20 kw each. The barge is now based at Montague, La.

BOYCE-HARVEY Machinery, Inc., recently installed a Caterpillar diesel model D386 12 cylinder power generator on one of Shell Oil Company's offshore drilling barges.

WILLIS CUNNINGHAM of Houma, La. has had one of his small oil field tugs repowered with a Caterpillar diesel engine model 326, rated at 170 hp. The engine was sold by Boyce-Harvey Machinery, Inc., and the work was done at Bollinger's Machine Shop and Shipyard at Lockport, La.

THE CANAL tug *James*, owned by Cleo and Roy Toups of Harvey, La., has been repowered with twin Caterpillar diesel engines model D375, rated at 320 hp. each. Harvey Canal Shipyard did the repowering job and handled the complete reconversion.

LEBOEUF BROTHERS Towing Company of Montague, La. have purchased

an Enterprise diesel engine model DMM 36, rated at 400 hp. at 800 rpms. from the New Orleans branch of the Enterprise Engine and Machinery Co. to repower the tug *Mary R* for oil field towing.

F. B. WALKER and Sons shipyard in Pascagoula, Miss. has just completed the sixteenth geophysical survey vessel for

the offshore oil industry. She is the *M/V Lurline Walker* and she is powered with twin GM diesel engines series 610, rated at 300 hp. each. Like the other Walker-built survey boats, the *Lurline Walker* is 110 by 22 by 6 ft., has air conditioned quarters for 14 men and has 5500 cu. ft. of cargo space. She also is equipped with two 20 kw generators and Ingersoll-Rand air starter.

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worn parts... cast or
fabricated.

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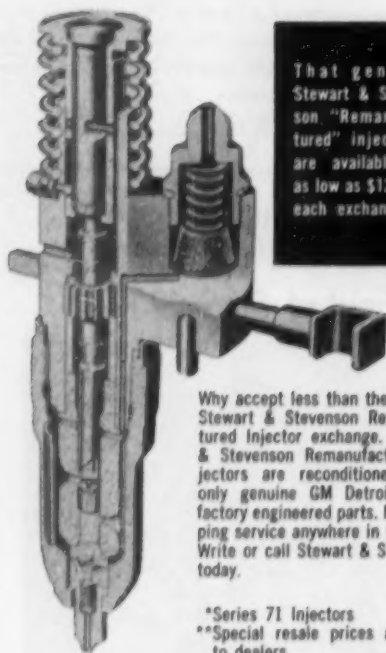
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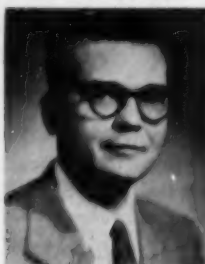


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New Industrial Equipment Division



Revis L. Stephenson

The combining of the Air Appliance and Industrial Filtration Divisions of the United States Hoffman Machinery Corporation into a new division to be known as the Industrial Equipment Division, was announced recently by Hyman Marcus, president of the multi-million dollar concern. Mr. Marcus also announced the promotion of Revis L. Stephenson, general manager of the Air Appliance Division, to the position of vice-president in charge of the new Industrial Equipment Division. According to Mr. Marcus, the move is aimed at further strengthening the industrial operation of U. S. Hoffman with an eye toward an expanded sales program of industrial products in line with the recent announcement of general expansion plans within the corporation.

Mr. Stephenson joined the Hoffman organization in 1936 as a mechanical engineer and advanced to field engineer in 1941. In 1946 he became assistant manager of the Air Appliance Division, and in 1952 he was elevated to the post of general manager. It was also announced that Gordon Bennett will be in charge of the Industrial Filtration department. The new organization took effect as of December 22, with main offices remaining at 105 Fourth Avenue, New York, N.Y., while manufacturing will continue in Syracuse, N.Y.

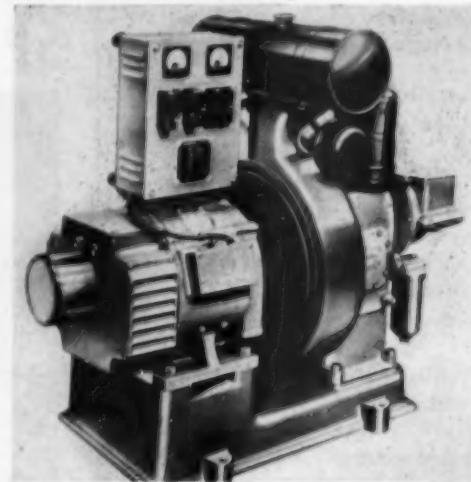
Opens Jacksonville Branch



To better serve the Southeast, Hercules Motors Corporation has opened a new factory branch located at 400 South Edgewood Avenue, Jacksonville, Florida. The new branch will serve as a parts warehouse for Florida, Alabama, Georgia and South Carolina. Facilities of the new factory

branch include a large salesroom, modern offices, complete parts department and fully equipped repair shop. Hercules gasoline, gas and diesel engines and power units will be available for immediate delivery. In addition, a large stock of service parts will be maintained at all times to provide an immediate source of parts for the many users of Hercules engines in the agricultural, construction, transportation, industrial and marine industries. The new branch is manned by factory trained personnel. Mr. John C. Poulton is the branch manager.

Small Diesel Generating Set



A 5-kilowatt generating set powered by an air-cooled Armstrong Siddeley single-cylinder diesel engine. The single-cylinder engine develops 6 to 11 horsepower at 1000 to 1800 rpm. The Engine Division of The National Supply Company distributes these engines in the United States.

Executive Vice President

The Nickel Cadmium Battery Corporation, Easthampton, Massachusetts, announces the appointment of Mr. Grenville B. Ellis as executive vice president, effective January 1, 1955. Mr. Ellis graduated from Norwich University, Northfield, Vermont, in 1927, with a B. S. degree in Electrical Engineering, and did postgraduate work at Carnegie Tech., Harvard University and the Massachusetts Institute of Technology. During his early business career he was with the Westinghouse Company as an electronics engineer.

CRANKSHAFT REPAIRS

SPECIALIZING IN LARGE CRANKSHAFTS

CALL OR WIRE

MAIN 2-5242

BRODIE
SYSTEM
AN ENGINEERING SERVICE

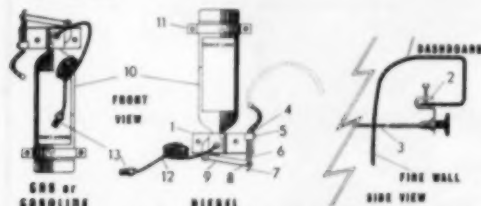
Shafts brought to standard sizes—
no need for undersize bearings

- REGRINDING
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- THERMIT WELDING
- METALLIZING
- CRANKPINS TURNED OFF IN PLACE

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LARGEST CRANKSHAFT GRINDER IN A JOBBING SHOP

"Power Choke"

Available for fast operational starts in all kinds of weather, the Power Choke is designed for diesel and/or all internal combustion type engines. Manufactured by the John Manufacturing Company, the unit provides a minimum of 100 fully operational starts on diesel engines and 350 starts on gas and gasoline engines with each Power Choke fuel tank. Installation is simple and the operation is guaranteed.



The Power Choke, according to the manufacturer, has been extensively laboratory and field tested to give instant starts despite outdoor exposure to sub-zero temperatures. It is also claimed that the use of Power Choke will prevent oil dilution, prevent excessive wear on piston rings and cylinder walls and remove excess carbon deposits from cylinder heads. It will also prevent excessive wear on the electrical system by providing instantaneous starts.

Power Choke is safe and simple to use. It makes use of a specially compounded mixture of PC-50 liquified petroleum products specially designed to automatically trigger ignition and maintain combustion of regular fuels to accelerate starting of the engine at all regular temperatures. For further information, write John Manufacturing Company, P.O. Box 2408, Phoenix, Arizona.

Caterpillar Display

The Cat D397, largest and most powerful diesel marine engine manufactured by Caterpillar Tractor Co. will be featured at the company's display at the 1955 National Motor Boat Show to be held in the Kingsbridge Armory in New York, Jan. 14-23. The 450 horsepower diesel will be equipped with a Falk Marine Gear. The engine will be opened at the crankcase and the entire unit will be displayed at such an angle that will show ease of accessibility in overhaul and maintenance. A working cutaway of the D397 will also be displayed. Especially applicable for use in smaller pleasure craft is the 60 horsepower Cat D315 which will also

be on display. A cutaway of the Cat D337 will be shown as well as the D13000 diesel electric set.

Attending the show will be vice president Henry H. Howard, sales manager William H. Ziegler, W. C. Burgy and Alex Bryner of marine engine section and Al Hoben, Ralph Bradley, James Hoak and Dick Dietsch of sales promotion department.

Industrial Relations Director



Robert H. Williams

Wm. E. Butts, president of General Metals Corporation announces the addition to his staff of Robert H. Williams as industrial relations director. Mr. Williams will counsel on and coordinate the various divisional industrial relations programs within the General Metals Corporation. He comes to his new post with eighteen years experience in industrial relations, covering labor contract negotiations, personnel research, accident prevention, supervisory training, wage and salary administration, personnel management, employee services and community and public relations.

Offers Complete Line of Strainers



A full line of strainers is now offered by Detroit Controls Corporation, Detroit, Michigan. These line strainers are designed to protect valves and pumps in all fluid systems; for refrigeration applications as well as for water, oil, air and general usage. Fabricated of ferrous metals and non-ferrous metals for use with specified fluids, they are offered in cleanable and non-cleanable models. Detroit strainers are built with reinforced Monel and stainless steel screens of 60 and 80 mesh, with up to 180 square inches of screen area. Finer meshes are furnished on order. These strainers are available with connection sizes up to 5/8 in. SAE, 3-5/8 in. sweat and 1-1/4 in. FPT with flange.

Over 85% of the torque wrenches used in industry are

Sturtevant TORQUE WRENCHES

Read by Sight, Sound or Feel.

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

In inch gram's...inch ounces...inch pounds...foot pounds

Every manufacturer, design and production man should have this valuable data. Sent upon request.

CRANKSHAFTS

HARDSURFACED

FACTORY STANDARD SIZE

The only patented crankshaft reclamation process which restores rod widths and main journal thrust to original standard size, at your service:

- 1) Any uncracked crankshaft forging can be restored to original factory standard size regardless of wear.
- 2) Crankshafts resurfaced by automatic machines.
- 3) Two heat-treating furnaces.
- 4) Ten crankshaft grinding machines.
- 5) Controlled micro-inch finish.
- 6) Dynamic and static balancing.
- 7) Rigid inspection—before and after processing.
- 8) Savings—up to 75% of cost of a new crankshaft.
- 9) Can be reground, same as original.

Write Department B for complete Industrial Price Sheet and our offer for used, uncracked heavy duty crankshafts—any undersize.

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Save Half the Cost of Diesel Fuel

Injection Parts and Still Do an A-1 Job for Your Customer

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Factory Type Reclamation Service

DON'T BE "STUMPED" FOR INTERNATIONAL PLUNGERS AND BUSHINGS; FACTORY TYPE PRECISION WORKMANSHIP—SAVE HALF!

We reclaim American Bosch Plungers and Bushings. Just Look:

PPK 1/4Z	\$8.15
PPK 3/4	\$7.20
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GMC Plungers and Bushings for Nos. 71, 110, 268, 278, 567
Complete No. 71 injector; TV 55, 60, 70, 80, 90
and in High Valve Sizes

WE HAVE A COMPLETE CATERPILLAR DEPARTMENT. LOOK AT THE SAVINGS:

Caterpillar Pump—full factory-type reclamation, tested, calibrated and ready for installation on cam-shaft housing, any size, each \$12.00

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Write for Catalog and Details on Becoming a Hancock Dealer... You'll Make Money on Over-the-Counter Sales and Save Plenty More in Your Shop.

HANCOCK
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Your broken diesel cylinder heads
THEY CAN BE REPAIRED
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20 KW TO 1200 KW



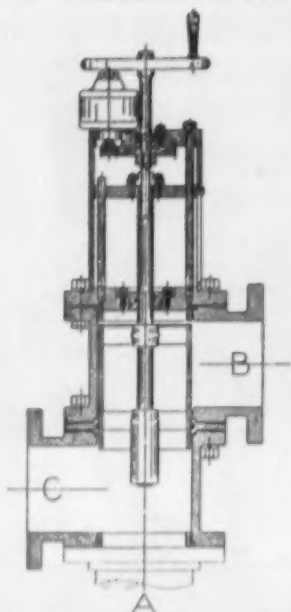
Fairbanks-Morse 1136 KW.
on our test stand.

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LARGE CONTROL VALVES



Amot Model D, 3-way, thermostatic valves will give excellent automatic temperature control for engine jacket water on header type systems using several engines connected to the same water header.

Check these Amot features:

1. Low pressure drop.
2. Available sizes: 6" to 36".
3. Balanced valve makes control easy and accurate.
4. Action is so easy that a small air motor operates the valve.
5. Amot positioner assures true modulating type of action.
6. Valve position indicator is standard.
7. Sensitivity of control is adjustable.
8. Cushioned travel at end of stroke prevents strain on operating mechanism.
9. Positioner operates on 5-15 psi variable air pressure. Valve will operate on any controller having these characteristics.
10. Prices are competitive.

AMOT CONTROLS CORP.
RICHMOND 1, CALIFORNIA

Like money in the bank!

A casting is almost never broken beyond repair. It does not always have to be replaced. Repairs can be inexpensive and the repaired unit will deliver "as new" performance.

DO NOT DISCARD IT

For only a fraction of its replacement cost, Southern Welding and Engineering Company experts can rebuild that shattered casting. Like hundreds of satisfied customers, you too will be amazed at the "impossible" repairs they achieve.

SOUTHERN WELDING & ENGINEERING CO.

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Wichita Falls, Texas Odessa, Texas

Please address all inquiries to our
Wichita Falls plant.

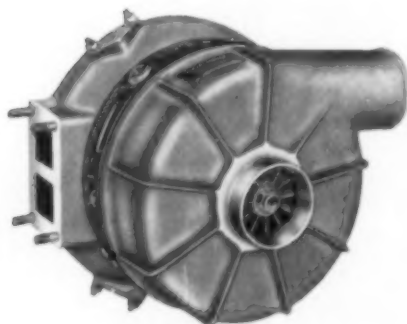
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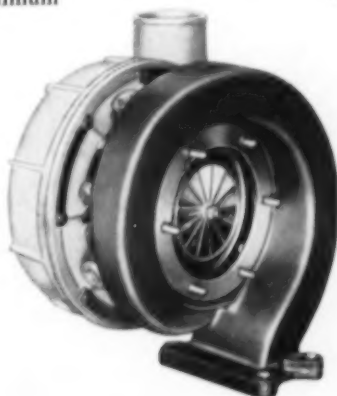
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By
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MODEL D 5U TURBOCHARGER

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OGDEN SAVES \$10,000 A YEAR ON FUEL ALONE!

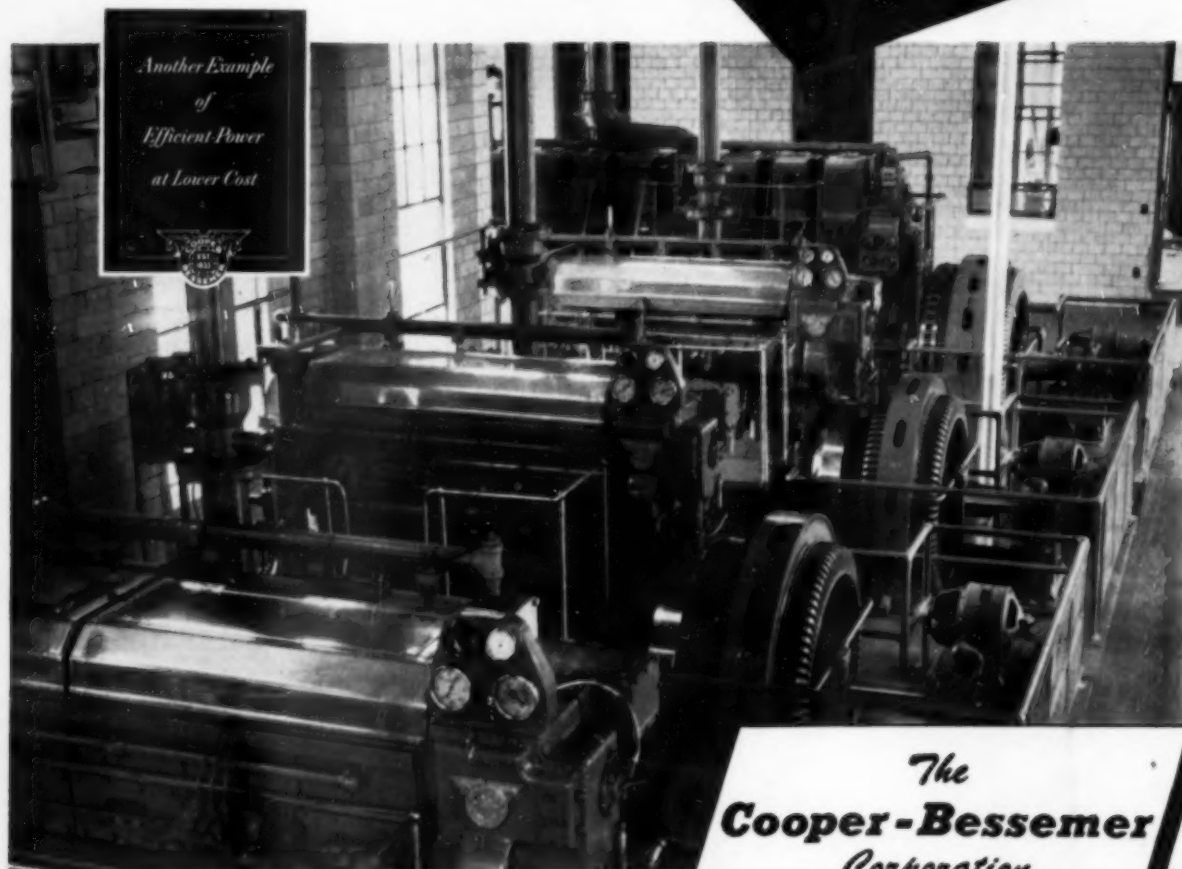
THE engines shown below are cost-cutting Cooper-Bessemer Gas-Diesels in the extremely modern, highly efficient Municipal Electric Plant at Ogden, Iowa.

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